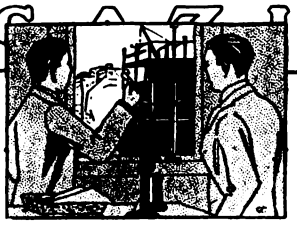
THE REAL ESTATE MAGAZINE



ALLAN ROBINSON — Editor and Publisher

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The Epic of the Equitable---A Foreword

THE completion of the New Equitable Building is the end of an Epic. It is as hopeless a task to condense this Epic into one hundred magazine pages as it would be to write the history of the World in a pocket diary. All that can be done is to endeavor to describe those features which, in our opinion, will be of the most value to the readers of the REAL ESTATE MAGAZINE and those who are renters of offices.

Contained in the Epic of the Equitable Building are all the elements of life, all the emotions of humanity. In it are romance and matter-of-fact, tragedy and comedy, ambition, hope, despair, everything but failure. This huge pile represents the Struggle of All Life, which is to succeed in spite of Man or Nature. It condenses all the learning, all the cunning of hand and brain, all the lessons of success and failure that have come to man in the erection of buildings since the rearing of the Pyramids. It compresses the building wisdom of all ages into forty stories of steel and stone. It is the apotheosis of the Skyscraper.

From the beginning, before one spadeful of earth was turned, it met with the barrier which faces all men and which they must scale to succeed—the barrier of Competition. The Business Jungle knows no law but that of might or strategy. It is not selfishness. It is self-preservation which is at the bottom of competition. And in these days Self-Preservation means Money.

In my belief there never has been in New York City an office structure in whose actual erection the owner took so active a part. In the building of the New Equitable, General Du Pont, through his Superintendent of Construction, has been the center from which all action radiated. His hand has been on the pulse at all times; no change could be made without his knowledge and consent, and the full report of each day's progress and the details of the various problems which have arisen from time to time have been put before his eyes.

It is the Architect's business to design and plan a building; it is the business of the general contractor to erect the building in accordance with the architect's plans and specifications. It is the business of the owner to make a profit on his investment. And, as this Magazine has contended from its start, the only way the owner can make a profit on his investment is to know at first hand how his building is being reared and the nature and quality of the material and equipment that go into it.

The Renting and Operating Departments of the New Equitable have followed each day's construction work as closely as have the owner, the architect and the general contractor. They have sat in the councils which have guided the work. The business of the Rental Department is to sell service. The business of the Operating Department is to give service. The better the service the more tenants; the more tenants, the more profit for the owner.

Elsewhere in these pages is related the manner in which this truly marvellous structure has been erected. And there are also described in detail the chief features of its service, equipment and operation. What I wish to emphasize here is my conviction, reached after a thorough investigation of contracts and many hours of intimate conversation with those who have been responsible for the work in all its details, that this building has been erected first, last and all the time to earn a profit on the investment by giving to its tenants the best service that is given anywhere in an office building in the world.

It might seem to the layman that better service than is now given in the best of our modern office buildings is impossible. But the creation of each new building makes opportunities for advancement, opportunities which are promptly seized by the architect, the owner and the builder, the renting agent and operating manager. There is no halt in the march of progress.

Mr. E. R. Graham, the architect, may not consider this his greatest work, but the thousands who traverse its corridors from day to day will inseparably link his name with it. It is an architectural triumph which takes its place beside the Woolworth and the Municipal Buildings, the three towering structures which now dominate the sky line of the metropolis. The Thompson-Starrett Company, the general contractor for the New Equitable Building, might well claim that its fame is imperishably written on New York's sky line, for all of these three buildings have been constructed by this firm.

We travel to far countries to see the ruins of ancient piles. We look on the Pyramids with awe. We gaze with wonder on the Coliseum. But millions of us, day after day, have passed by the New Equitable Building without realizing that it is a mightier work than either of these relics of extinct empires. Therein ten thousand persons will live each day their business lives. Therein will be enacted in real life the play life of the stage. Fifty thousand persons will constitute its floating population, making of it a city, wherein will be transacted the business of a city. In reality it will be a city within a city, with its main thoroughfares and its side streets. One could come up from under the ground into this building, naked as he was on his natal day, and before he left it for the outer air be completely clothed in the newest mode, buy a house, open a bank account, incorporate a business and—well, why not—take unto himself a wife. There will be hardly a human need or luxury that one cannot obtain somewhere in the miles of cement paved streets. It will be the show skyscraper of New York City.

The greatest building in the World and the greatest building in the greatest city of the New World! It is not only the permanent proof of the faith of its owners in this greatest city, but it is speaking, living proof of the fact that New York City still goes onward and upward.

F. A. AUSTIN

General T. Coleman du Pont, President
Equitable Building Corporation

Gen. Thomas Coleman du Pont

The Man Who Made the New Equitable Building Possible

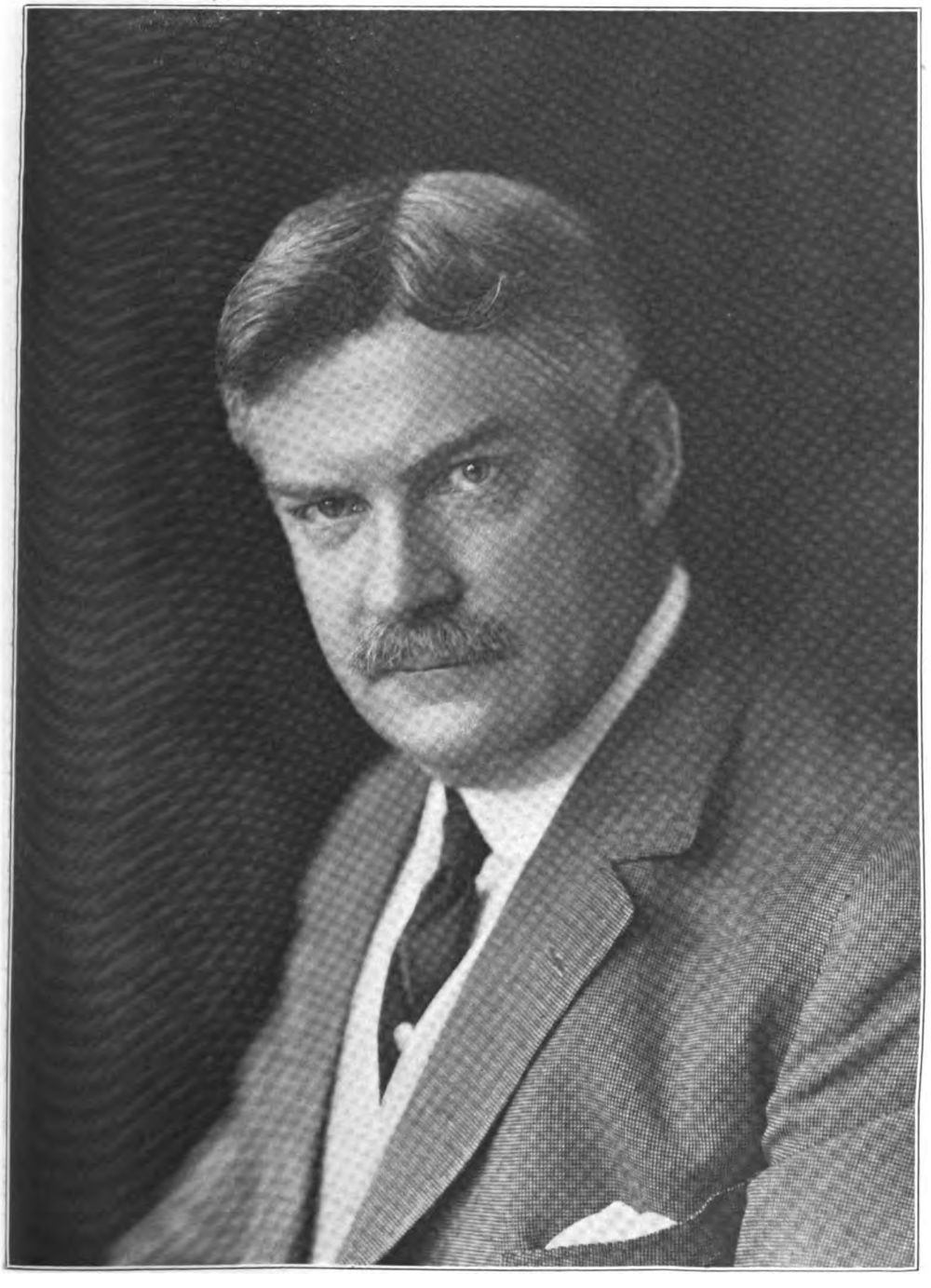
GEN. THOMAS COLEMAN DU PONT, president of the Equitable Building Corporation, which made the new Equitable possible, is a man of many activities. Not only is he the head of this monster building corporation, which will represent an investment of $29,000,000 in land and building, but he is also the chief factor in the du Pont Nemours Company, the largest manufacturers of gunpowder and high explosives in the United States.

He is, as well, much interested in the question of good roads and in a substantial way, for he has given $2,000,000 to construct a great boulevard across the state of Delaware. He has also taken an active interest in politics, having been a member of the Republican State Committee previous to the spring of 1914.

General du Pont was born in Louisville, Ky., December 11, 1863. His parents were Bidermann du Pont and Ellen S. Coleman. He was educated at Urahana University, Urahana, O., and at the Massachusetts Institute of Technology, to which, by the way, he gave $500,000 in May, 1911. The du Pont family has been closely identified with the republic almost since its birth.

It was in 1799 that Pierre Samuel du Pont de Nemour, the founder of the big powder works with which the family name is identified, came to this country, a political exile from France. He was essentially a Frenchman, filled with love for his native land, and when order was restored after the fall of the first French republic, he returned to France, and remained there until the return of Napoleon from Elba, when he came back to America, to rejoin his children who had remained. He found here a rich and fertile soil for the workig of his special knowledge and talents. The du Ponts opened negotiations with President Jefferson, and made him realize the advantage which would follow to the country, the establishment by one of the world's most expert powder makers of an industry which would render the United States independent of Europe in the matter of this important element of defense and offense, and he gave the project his cordial approval. It was in 1802 that the du Ponts built their first powder mill in the United States, at Wilmington, Del., on the banks of the Brandywine. This city to-day, 112 years later, is still the headquarters of the big industry which developed from this humble beginning. The industry is now the fourth largest in the United States, with ramifications extending all over the world, handling millions of dollars' worth of business annually and having on its payroll more than 15,000 people, a large proportion of them highly skilled workmen.

Since the War of the Revolution the United States has fought all its wars with du Pont powder. War has taught the du Ponts that the making of powder for fighting is as much of a curse to the powder factory as it is to the nations involved in hostilities. World peace has no firmer friends than the du Ponts, if for business reasons only. But less than 12 per cent of the output of the company is for war purposes. The evolution from the simple formula of the old black gunpowder to the complicated chemical products of the great mass of high explosives to-day has found the du Ponts always in the van, and often clearly in the lead. Millions have been spent in experiments and laboratory work, to the end that newer, better, and safer explosive compounds might be developed. The founder of the industry died in 1834, and the succession passed to Alfred Victor, who was the manufacturing expert, and Henry, to whose financial genius is due the fact that the enterprise weathered the panics between 1850 and 1889. Henry du Pont followed in directing the destinies of the business, and when he retired in 1889 the E. I. du Pont de Nemours Company was one of the great industries of the United States. The builder of the new Equitable Building became the head of the family in 1902.



E. R. Graham, the Architect of the New Equitable Building

Ernest Robert Graham

Architect of the Equitable Building

ERNEST ROBERT GRAHAM was born at Lowell, Michigan, August 22, 1868. Mr. Graham entered the practice of architecture at an early age, devoting himself to the construction side of the work. When the World's Fair was ready for actual building operations Mr. D. H. Burnham, who was in charge of the entire enterprise as Director of Works, realized that construction operations by means of an army of some 19,000 men made it necessary for him to have in charge the ablest builder and manager of men whom he could select.

After considering all the available candidates he selected E. R. Graham, who was then in charge of building operations for Holabird & Roche, architects, of Chicago. He took the entire responsibility, night and day, for several years in carrying out that great enterprise. On completion of the Fair buildings, which involved the exercise of all the various functions of an architect's work under peculiarly difficult circumstances, he entered into partnership with Mr. Burnham, the firm name being D. H. Burnham & Co., an association which lasted until Mr. Burnham's death in 1912. The new firm since 1912 has been Graham, Burnham & Co., of which Mr. Graham is senior partner.

His work during the period from 1891 to 1914 has covered building operations of the first rank in all parts of the United States, reaching from New York to San Francisco and Duluth to New Orleans. Among the most noteworthy buildings, in addition to the Equitable, are the Union Station in Washington, D. C.; Flatiron Building, New York; new Continental & Commercial Bank Building, Chicago; Marshall Field & Co. Stores, Chicago; New General Post Office, Washington, D. C.; Wanamaker Stores in Philadelphia and New York; the Biltmore Hotel in New York City, in association with Warren & Wetmore; Claridge's and Eighty Maiden Lane Building, New York City. Other important buildings now about to enter the construction stage are the new Field Museum in Chicago and the new Union Station for Chicago.

Louis J. Horowitz, President
Thompson-Starrett Co., General Contractors;
Vice Pres't Equitable Building Corporation.

Louis J. Horowitz

Head of the Thompson-Starrett Company

Mr. Horowitz was born at Chenstochowa, Russia, January 1, 1875, where he received his early education. At the age of seventeen he left Russia for the United States, and landed in New York without money, without friends and with little or no idea as to what he should do for a living. A fair education, however, good health, indefatigable energy and the determination to wrest a livelihood from the land of his adoption stood him in good stead.

He was fortunate in entering the real estate field shortly after his arrival, and subsequent events have proved the wisdom of his choice. In the course of a few years, by dint of assiduous application, he made himself thoroughly familiar with real estate operations and values and assimilated sufficient knowledge of real estate law to use it to advantage in the ultimate acquisition of real estate interests of his own. In 1902 he was elected president of the Brooklyn Heights Improvement Company. Later he became interested in various building enterprises, and handled his ventures so successfully that he was soon recognized as a factor in local building and real estate circles. At about this time he became prominently before the stockholders of the Title Guarantee & Trust Company, who, together with certain Standard Oil interests, in 1903, became largely interested in the affairs of the Thompson-Starrett Company, which resulted in the selection of Mr. Horowitz to join that company in the capacity of financial man.

At the beginning of 1907, Mr. Horowitz was elected vice-president of the company, and immediately turned to the work of securing new business and renewing the confidence of owners and architects. But in November, 1907, the memorable panic came, and from that period dates the ascendency of Mr. Horowitz in the public eye. Theretofore his efforts had been confined to improving internal conditions. He had now to cope with adverse conditions from without. He had, so to speak, to nurse his patient through convalescence without nourishment, and it was his administration of the company's affairs during this threatening period that revealed his fitness for the responsibilities of his office. That the company pulled through these times was undoubtedly due to his indefatigable labors, and within less than a year thereafter it was engaged on a number of important operations, both in New York and throughout the country, and the volume of business it has handled since has fluctuated between fifteen and twenty millions annually.

One of the former crowning achievements of the Horowitz régime is the Gimbel Building, at Broadway and Thirty-third street, New York City. In the face of competitive opposition and at a time when there was abundant excuse for abandoning the project, Mr. Horowitz came out triumphant with a contract for the Thompson-Starrett Company. The transaction involved $12,000,000 for land and building, and one hundred millions of money for one hundred years of rent.

Since the Gimbel contract was closed, however, Mr. Horowitz has engineered other building enterprises of equal, if not greater, magnitude, notably the McAlpine Hotel, at Thirty-fourth street and Broadway; the Municipal Building for the City of New York; the Woolworth Building and the Equitable Building.

Mr. Horowitz disclaims all but a small share of the credit for the company's prosperity, for, as he himself puts it: "Without the support of the organization —which I am glad to say I now have in unstinted measure—on the one hand, and the potent influence of our directors on the other, I could have done nothing. Battles are won not only by the first but also by the second in command, and the third and the fourth, by the whole general staff, in fact, and by the co-operation of every man under fire, whether he be a guilded aide-de-camp or a drummer."

To-day Mr. Horowitz is president of the Thompson-Starrett Company, having been elected to that office March 21, 1910.

Pertinent Facts Concerning the New Equitable Building

Site, Broadway, Cedar, Pine and Nassau Streets, New York City.

Value of land, $14,000,000. Value of building, $15,000,000.

Construction begun June 10, 1914. Construction completed, February 1, 1915.

Area, ground level, 50,000 square feet. Cubical contents, 26,000,000 cubic feet. Rentable floor space, 1,200,000 square feet.

Street number, 120 Broadway.

Height, from sidewalk to pent house roof, forty stories or 545 feet. (The pent house is two stories high and there are two inside stories which do not show on the exterior, the actual number of stories being 36.)

Space per floor, 30,000 square feet.

Center tower, 555 feet.

Three basements.

Weight of steel frame, 32,500 tons.

Weight of granite, brick and marble, 250,000 tons.

Architectural plan, base, shaft and cap. Base, granite and ornamental terra cotta; shaft, brick; cap, brick and ornamental terra cotta.

Rock bed foundation, 85 feet below curb, around entire site.

Outer wall of foundation, cofferdam of concrete, six feet wide and eighty-five feet deep from curb to solid rock, strengthened by steel rods. Eighty steel and concrete piers go to solid rock. Resting on these piers, eighty-eight granite columns, extending to roof. Fifty other granite columns rest on concrete monoliths, resting on the cofferdam.

Average number of workers employed each working day, 2,500.

10,000 doors. 5,000 windows.

Elevators, 53.

COMPARISON OF SAFETY FEATURES IN THE NEW AND THE OLD EQUITABLE BUILDINGS.

	New Building	Old Building
STRUCTURAL METAL WORK.	Steel throughout.	Wrought iron and steel supported by cast-iron columns.
FIREPROOFING of STRUCTURAL METAL WORK.	Terra-cotta and concrete, all steel protected.	Webs of beams and girders protected by arch construction; no other fireproofing.
FLOORS.	Terra-cotta, steel and composition.	Wood on brick or hollow tile arches between iron and steel I-beams.
ROOF.	Tile and concrete.	Brick over waterproofing on heavy cinder fill, arch construction, iron column supports, mansard of wood and slate.
ELEVATORS.	Brick shafts, metal cars and fire-doors of steel and asbestos.	Brick shafts, wood doors hung to wood trim, hardwood cars, door panels and spaces of open grille.
STAIRWAYS.	Four continuous, grade to roof, in fire towers.	Only one continuous from grade to eighth floor, tile and thin glass partitions, iron frames and risers, marble treads unsupported by plates.
DUMBWAITERS.	In basement only; fireproof.	In tile shaft, wood with wood doors and platforms—caused spread of fire.
LIGHT SHAFTS.	Large open brick shafts.	Plaster and metal lath, also hollow cinder plaster blocks and thin glass with wood sash and frames; allowed accumulated effect of heat.
VENT SHAFTS.	Brick, automatic fire-damper on each floor.	Brick, openings on each floor.
FIRE TOWERS.	Four, brick, terra-cotta and steel.	None.
TRIM.	Metal, non-combustible.	Massive hardwood, combustible.
PARTITIONS.	Steel and terra-cotta.	Terra-cotta, tile wood and glass, hollow plaster blocks, metal lath and plaster doors, wood and thin glass; no value as fire stops.
FIRE AREA.	Divided by fire walls into four areas each entirely independent.	One entire undivided block (48,000 square feet).
WIRE GLASS.	Skylight and elevator-shaft protection.	None.
STANDPIPES.	Four 6-inch, each in fire tower.	Two 4-inch pipes with 2½-inch outlets on each floor.
TANKS.	Two 47-foot pressure and one gravity tank.	Two, 2,250 gallons each.
HOSE.	100 feet at each standpipe outlet.	100 feet at each standpipe outlet.
FIRE PUMPS.	Two 1,000 gallons per minute each.	Two duplex steam, 350 and 450 gallons per minute.
AUTOMATIC SPRINKLERS.	Automatic in stores, storerooms, boiler-room, etc.	None.
CHEMICAL EXTINGUISHERS.	Throughout.	Few.
WINDOW FRAMES AND SASH.	Metal.	Wood.

The Architectural Features of the New Equitable Building

In the new, thirty-eight-story Equitable Building, the problem of planning an office building was presented perhaps for the first time in an entirely new form.

Given an entire block of real estate, open to streets on all four sides, and located at the center of the most expensive real estate values, the problem was to produce the utmost possible income from the property; or, in other words, to plan as high an office building as could be built for revenue producing purposes. The desire was not to build a high tower for the sake of architectural effect or other reasons, but to erect a building of such a height as to produce the greatest return in proportion to the investment.

As an illustration, in most office buildings it is found that for each additional story the income is more than increased in proportion to this one story for the reason that the real estate investment remains the same, cost of foundations and roof remain approximately the same, and the general overhead expense of operation remains about the same. On the other hand, this process of adding on stories could not be extended indefinitely because the corresponding increase in elevators and stairways would ultimately eat up the entire area of the lot.

Balancing Stories and Income

THE PROBLEM, therefore, was to find exactly the right balance, and to increase the rentable area by additional stories up to the point beyond which any further increase in rentable area would constitute a relative decrease in renting value.

Few persons realize the stupendous task which confronted the architect of the largest office structure in the world, nor can the average person conceive of the vast amount of detail work necessary before his plans were accepted. Every piece of stone, every bolt and rivet, every piece of steel beam and girder, the elevators, the great blocks of granite, limestone, slate and marble, the terra cotta —in fact, every bit of material, exterior and interior, which goes to make the complete building is designed and given a number on the plans, and the assembling of these multitudinous parts is like putting together the pieces of some gigantic jig-saw picture puzzle, only in this case the architect's plans were the key to the puzzle.

In Form of Letter H

THE NEW Equitable Building is in the form of a letter "H." The front and rear, or its narrow sides, are exactly similar and face in Broadway and Nassau street. The Pine and Cedar streets sides are also identical. The building is solid up to the seventh story, beginning with which at the two ends are two large light courts, open to the streets. The total height from the sidewalk curb is 525 feet, in addition to which there is a two-story pent house 30 feet high, measuring 85 by 120 feet. There are basement, sub-basement, sub-sub-basement.

The construction of the foundations involved some of the most difficult problems of engineering. A solid rock bed, 80 feet below the curb around the entire site, is the most important piece of the foundation. On this bed rock rests the cofferdam which encloses the foundation, covering 49,000 square feet. On the Nassau street side it extends 150 feet, on the Broadway side 167 feet, on the Cedar street side 315 feet, and on the Pine street side 304 feet, forming about 395 feet of giant caissons of concrete and steel, 80 feet long, 6 feet deep and of various widths. The cofferdam is a solid concrete wall reinforced by heavy steel rods. There is a retaining wall extending from Cedar to Pine streets, built principally for creating two levels for vaults and cellars beneath the building.

Style, Classic Greek and Roman

THE EXTERIOR in architectural design is classic, freely interpreted, and inspired from the best examples of Greece and Rome, chiefly Roman and Corinthian. The first four stories are white granite with terra cotta to match for three stories more. The thirty stories above this are of porcelain faced light gray

brick with terra cotta trimmings to match. On the two façades and at the sides of the building are a series of pilasters 54 feet high with capitals. Those at the two façades are 5 feet in width and are of white granite. The frieze over this is of terra cotta, 12 feet wide and enhanced with classic ornaments. Above it, on all sides of the building, are a series of pilasters 54 feet high with capitals, over which in turn between two belt courses is a series of short pilasters, marking the seventh story, where the light courts have their beginning. A central motive directly over the main entrance in a sculptured setting is at the front of each light court and supports the flagstaff. From the eight to the thirtieth floors the building is plain, being marked, however, by windows which are grouped in pairs and are in vertical and horizontal order without breaks.

At the base lines of the thirty-first and thirty-second stories are belt courses, and above the upper one is a series of pilasters in terra cotta, 50 feet in height and embellished with capitals. These support the ornate cornice, also in terra cotta, above which are the thirty-sixth and thirty-seventh stories with pediment at the two façades. There is a *pleasing* belt course at the base of the thirty-seventh story and a finishing course at the sides of the roof line. The pent house will be finished in brick and terra cotta with pilasters to correspond to the rest of the exterior. The light courts are finished with brick and terra cotta in the same manner as the two sides.

Interior Streets on Ground Floor

THE PLAN of the ground floor creates two interior street or arcades bisecting the building in both directions, and continuous with Broadway and Nassau, Pine and Cedar streets. The lobby is 24 feet in width and 20 feet in height at the ends, with a central portion 35 feet in height. The entrances to this floor on the two principal façades are arched and lead to the central body, which is decorated with an order of pilasters in Tavernelle marble and a coffered ceiling of ornamental plaster. The entrances at the two sides of the building are similarly treated. The exterior of the first story is marked by bank fronts and on the interior, bordering the arcade thoroughfares, are a series of especially attractive glazed openings. The arcade will be finished with a marble floor and a Tavernelle wainscotting. The doors in the storm vestibules of the arcades will be of the revolving type and will be of bronze.

The stairways which extend from the basements to the thirty-eighth floor are finished with marble wainscotting and base, and iron risers. They are enclosed in smoke-proof fire towers and are naturally of fireproof construction. There are four stairways and towers, and as these will serve as ample fire escapes there will be no steel stairways on the exterior to mar the general appearance.

The interior is finished in mahogany and marble, the ceilings and upper walls being plastered, with ornamental cornice and friezes. Tinted grilles will be a conspicuous feature on some floors and on the thirty-sixth and thirty-seventh floors, where their presence add to the general effect and attractiveness of the club quarters, artistic skylights are installed.

The Modern Building Organization

By Louis Jay Horowitz

The following is one of a series of lectures especially prepared for the Alexander Hamilton Institute and is reprinted by permission:

Primitive man had to seek shelter from the elements, and whether his domicile was a cave hewn out of rock, or a mud hut solidified by a friendly sun, his constructive energies were called into play, and rude as his habitation was, it was the rude beginning of the science of building construction. Thereafter, as man's needs multiplied, the art of building, embellished by the architecture of successive epochs, has progressed from the primitive phase to its present phase of commercialism and utility. The art of building might be termed a sort of physical literature. It reflects in its architecture the thought of the period.

Utility and Economy

The stream of modern thought is in the direction of man's comfort and convenience, and so, contemporary architecture puts utility first and art second. Art always follows utility as a matter of course. In modern architecture it is quite secondary in importance. Nowadays, utility is the paramount issue, and though not always the only consideration, it is consistently the first. A hundred and one economic conditions compel it, notably the increase in the world's population, the growth of cities, the facilities of travel, the expansion of commerce, the rise of capital, the needs of labor, the birth of new industries, and the disposition of communities to work, to live and to pleasure within the radius of a few municipal miles.

These conditions, and intensive population in particular, create high land values, and high land values demand large and necessarily complicated structures in order to ensure an adequate return on the money invested in land. This brings us to the subject of economy in building construction, which is so vitally necessary to the financial success of building operations. For unless a building enterprise is conducted along the most economical lines, the investment itself will deplete the income and thus defeat the object which was the primary inducement to build.

The determinants of economy in building construction are these:

Cost of Construction,
Quality of Construction,
Speed of Construction.

The first two are self-evident. The third will be better for amplification. Briefly, speed is of vital importance in modern building, because it conserves and contributes to the income on the investment. Most building contracts contain a time clause or completion date. This completion date usually takes into consideration one of the two rental periods in a year. It is from that completion date that an owner expects to put his building on an earning basis. Any delay beyond that date, therefore, is an unusual hardship, for, if the renting season be passed, it may mean the loss of a year's rent. In such event, the cost of the building is correspondingly increased.

To revert to the subject of Economy and its determinants, Cost, Quality and Speed, it is due to the conspicuous absence of economy in latter day building, that the modern building organization sprang into existence.

Old Methods of Building

The old method of building construction is brokerage, pure and simple. The general contractor procures figures from the various sub-contractors and parcels out the work at the best figures obtainable. Thereafter, the progress of the work generally takes care of itself. Whatever supervision exists is more or less desultory and woefully ineffectual. The general contractor knows nothing about the conditions in the workshops of the various sub-contractors, has no knowledge of their methods, costs, producing capacity, resources for obtaining

raw material, or their ability to adhere to completion dates. Nor is he at any pains to find these things out. If a sub-contractor is behind in his work, then such other work as is affected thereby comes to a halt. When this delay is overcome, the work proceeds until some other contractor defaults on his deliveries. Eventually, of course, the building is finished, but at a ruinous cost. Each delay has eaten into the rental return on the building, thereby disturbing the calculated ratio of income to investment. Still another example of the looseness of these methods is the reprehensible practice of sub-contractors in demanding exorbitant "extras" whenever an omission occurs in the plans or specifications or some change is required by the owners. These changes also invalidate the completion date in both the general contract and the sub-contract, and, as will be apparent, many requests for "extras" have an extension of time in view. This again increases the cost —*and the profit* to both general contractor and sub-contractor is also increased. In addition to these defects in the old methods of building construction, the interests of various sub-contractors are in a continual state of conflict. Complete harmony is impossible. Duplication of work is frequent. Each sub-contractor is obsessed with the idea of getting as much as he can and giving as little as he possibly can in return. All are inclined to exaggerate the importance of their respective work. Few have a genuine interest in the completion of the operation as a whole. None quite realize how costly is the absence of co-operation. And the root of the whole trouble is the absence of organized control.

New Methods of Building

It is significant that, despite the modern tendency to centralize great industries, not until recent years has any effectual attempt been made to establish in building construction some semblance of organized control. There are a number of reasons for this condition, chief among which is that from thirty to fifty different trades enter into the construction of the modern building. Each trade is handled by a concern whose relation to a building is that of sub-contractor. They are all more or less allied, but are too diverse to be welded into a whole. On the other hand, the mere fact of employing thirty or more sub-contractors on a building operation presents many problems not easy of solution. In the first place, each sub-contractor is prone to perform his own work without properly appreciating its relation to the whole. This is disastrous and costly, because no matter how systematized building construction may be, it is something more complex than putting sections together, like bricks of a doll's house. Every branch of the work is interdependent, and without a general spirit of co-operation uniform progress is more or less impossible. This, in turn, means delay, increased cost, and very often poor workmanship. But the worst feature of employing an army of sub-contractors on a building operation is that it materially increases the cost, quite outside of that increased cost which is is the sequel to delay. The cost of the work, to the general contractor, is the cost of the various lines of work, plus each sub-contractor's profit. The cost to the owner is the total cost to the general contractor plus the latter's profit. It will thus be seen that the owner pays two profits on all branches of the work. It is obvious that under better conditions he would pay only one. Obvious, too, that the only solution of this difficulty is an organization itself equipped to perform as many lines of work as can be profitably handled direct. This would do more than cut down the cost. It would centralize control and thereby facilitate uniform speed in every line of work. And finally, by bringing the major part of the work under direct supervision, it would ensure quality. Such work as remained to be handled by sub-contractors would in turn be comparatively easier of supervision, and the supervision would, therefore, be more efficient.

To date, however, only a few building organizations of any magnitude are in existence. For the most part building contractors in general cling tenaciously to old methods. Perhaps not without reason. The brokerage plan of erect-

ing buildings is profitable and easier than founding and perfecting a machine that can take contracts at a fixed figure, for a fixed fee, and deliver the buildings to their owners in a guaranteed time, as methodically as a tailor handles an order for a suit of clothes. But the brokerage methods of building construction are in decadence. The old style building contractor secures only an occasional contract, where a building organization procures business in volume. The fact is, the modern building organization supplies a long-felt need. It has introduced every phase of economy into building construction, thereby giving impetus to property improvements. It ensures and guarantees a maximum of income from building investments, where formerly a maximum of income was impossible, and any income at all was a speculation until the operation was finished. It has accomplished these things by the gradual departmentalization of the building business and by systematizing its methods to such an extent that it is a permissible exaggeration to say that every brick falls automatically into place.

The modern building organization is a machine. It is, or should be, as perfect in all its component parts as the inherent problems of building construction will permit. In a building operation conducted by a really efficient building organization, thoroughly equipped and systematized, no such condition can exist as those enumerated in the foregoing summary of old methods. In the first place, it will embrace within its own organization facilities for the direct conduct of every line of work that can be handled with profit to itself and its owner. In the matter of sub-contractors, it will itself have such an intimate acquaintance with costs that it will know beforehand pretty well what each branch of work is worth. It will never in any circumstances select the lowest figure at haphazard, but will consider in conjunction therewith the financial responsibility of the bidder, the quality of his work, his ability to adhere to delivery dates, his producing capacity, his raw material facilities, and his reputation in the trade generally. It will be governed by these considerations in awarding a sub-contract, *but it will cease to be influenced by them after the contract is let.* What a man did yesterday is no proof that he *will* or *can* do the same thing today, without constant vigilance on the part of the man who employs him. The modern building organization will, therefore, maintain a corps of intelligent material experts, from which it will recruit as many men as may be necessary to follow up, inspect, check and expedite the completion and delivery of every line of work. These men will attach themselves to the different plants, familiarize themselves with the conditions thereof, round up raw materials, figure out the time required in the processes of manufacture in relation to the sub-contractor's completion date, and continually keep that completion date in mind in relation to the completion date for the finished building. The modern building organization will handle the question of "extras" in an equally intelligent fashion. In the first place, "extras" for changes in a sub-contractor's work will be figured on the basis of cost and a legitimate profit. The modern building organization will know what such cost and profit should be. In the first place, it is familiar with the sub-contractor's costs. In the second place, it has actual representation at the sub-contractor's plant or in his shop, and is in the best possible position to know how far the sub-contractor's work has progressed at the time a change is ordered. No change, therefore, can be used as a vehicle for excessive profit, nor be unjustifiably urged as an argument for an extension of time. Again, duplication of work will be avoided and co-operation among sub-contractors ensured. The general contractor will itself be responsible for a large percentage of the work, will exercise a rigid and intelligent supervision over the balance of the work, and discipline the conduct of the whole.

In addition, a great building organization enjoys unique facilities for the profitable and expeditious purchase of material. It buys in such volume that it can buy cheaply: and, obversely, because it can buy cheaply it can and frequently does anticipate bulk material requirements by buying in volume. This in itself contributes largely to an economical

cost, and on an operation of any size may easily run into thousands of dollars.

A brief exposition of the systematization of modern building construction is attempted in the following pages. The chief departments and the functions of each are severally, if briefly, discussed. The order of importance is arbitrary to a large extent. In fact, though some departments have priority over others, practically every department gets under way simultaneously. Some departments, of course, are merely preparing to assume the burden where another department leaves off. On the other hand, certain departments which are unusually active in the earlier stages of an operation, are to some extent released as the work of actual construction advances. But, at the inception, all departments move as one. Nor is any department absolved from responsibility until the building is finally turned over to its owner. It will thus be seen that even systematization cannot reduce building construction to a series of relays. As a manufactured product passes through the various processes of fabrication, some department is permanently relieved of responsibility at the completion of each process. But building construction is too complex for that. While the site for a building is being excavated, preparations are also under way for the roof, and the window sash is being prepared long before the walls are up. The all-important thing in any building operation of magnitude is *preparedness*. And the modern building organization accomplishes this by performing *direct* a large percentage of the work, and arrogating to itself the right to supervise whatever work is sublet, as well as the further right, in the case of delay, to take work out of a sub-contractor's hands and adopt such measures for its completion as may be deemed necessary or expedient.

Promotion Department

The promotion end of the building business is a very important one and entails a great deal of missionary work. It requires a man with a comprehensive knowledge of the building business in all its phases, and one who is mentally equipped to talk forcibly and intelligently, not only on building construction, but on any general subject, relevant or otherwise, which may be injected into the main issue. It must be borne in mind that property owners generally, and architects in particular, are men of more than ordinary intelligence and attainments, and for that reason, if for no other, they must be approached by a man who is qualified to inspire confidence and command respect. It is not possible, however, to define a specific line of conduct for building promotion, for no two building propositions are ever alike in any particular and no general rules are applicable to the conditions surrounding each. Aside from competitive claims on an owner's consideration, the man whose work it is to approach the principals in a building proposition must be familiar with the methods of realty financing, know the condition of the loaning market, the extent of the loaning facilities of important institutions, and will at first sight have a fairly accurate idea as to whether the initial figures of a proposition bear a normal relation one to the other. He will from an examination of such data as is furnished him make some calculations as to the cost of such a building as is under consideration and be in a position to speak authoritatively as to the advisability or need of any important item included or omitted. Thereafter, he will arrange for a complete set of plans and specifications from the architect for the operation, which he will turn over to the Estimating Department to be figured. The old style building contractor takes only an apathetic interest in a project until he secures the contract, but the modern building organization confers with the principals, and when and where necessary advises changes in the financial scheme, or suggests such modifications in the plans and specifications as will bring the project within the available appropriation and eliminate waste and extravagance. In other words, the modern building organization places its experience at the disposal of any owner who needs practical assistance in establishing basic figures, and it renders such assist-

(*Continued on Page* 83)

Team-Work Built The New Equitable

The Method of Procedure—What it Was and How it Worked

By F. A. Austin

THE largest variation in any part of the new Equitable Building as it now stands, practically completed, from the final plans of the architect is three-eighths of an inch!

On March 10, 1914, the steel work was at the street level. On September 5 the steel work was completed for the entire forty stories.

The steam plant was furnishing steam for the building before the brick work of the last two stories was completed.

The building was scheduled for completion by the terms of the contract on February 1, 1915. Every condition of the contract was fulfilled on that date.

These three facts, standing out perhaps as the most indicative among a host of others conveying a similar meaning, were quoted to me by T. R. Tinsley, superintendent of construction for the Equitable Building Corporation, as proof of his statement that the new Equitable Building is, in every particular, the most wonderful piece of accurate building construction of modern times. Mr. Tinsley has spent most of his life in superintending the erection of steel and stone skyscrapers. For years he was superintendent of construction for D. H. Burnham & Company, the firm of Chicago architects who designed the pioneer skyscrapers of New York and Chicago. Wherefore he knows whereof he speaks. He predicted a date when the steel work of the new Equitable Building would be completed. He was four days out of the way, but he won a cigar. No other bet could find a taker.

It is the purpose of this article to tell how the truly marvelous achievement represented by the Equitable Building has been made possible. Boiled down to the most concentrated essence, it could be told in two words—team work. But the lover of football would not be satisfied to read only of the Yale-Harvard game, that Yale or Harvard, as the case might be, won by team work. He would want to know what the team work was and how the game was played.

The creation of the Equitable is probably the greatest piece of team work on record, great not only in accomplishment but in the number of those who have taken part in it. It represents the team work of thousands of men—of quarrymen, of stone cutters, of steamship and railroad men, of drivers of horses and auto trucks, of riveters, bricklayers, draughtsmen, excavators, architect, engineers, superintendents—in short of every man who has lifted a hand or had anything to do with the construction of the largest office building in the world. And this same team work has extended to the factories and shops of every manufacturer or producer of material or equipment that went into the structure, to every man in those factories or shops who has labored with hand or brains on the "Equitable Job."

This team work has been an absolute necessity for success. For the arrival of each piece of material, for the beginning and the completion of each step in construction, a certain time has been set. Allowing for some elasticity, if a piece of material failed to arrive on the date set or a certain part of the job was not completed on a certain day, the going forward of another part of the work was delayed. This in turn would cause a halt in the forging of another link in the chain. And delay thus continued would mean failure of the contractor to complete his task on the date set in the contract and the upsetting of the plans of the operating department and the renting department—the kind of delay for which another name is loss of profit to

T. R. Tinsley, Superintendent of Construction of the New Equitable Building for the Owner.

owner, contractor, sub-contractor and employees.

To use the football simile again, it would be as though the quarterback failed to complete the signal. The team is waiting, but it cannot make the play until it gets the rest of the signal. The game is at a standstill and there are only a few minutes left in the playing period. And when the signal finally comes, each man must do his part or the play fails. Thus, with the Equitable Building, each man, no matter how humble his task—he might be a moulder in a radiator factory a thousand miles away from the building—has been an integral part of the scheme of the thing, and his failure to complete his job on schedule time might endanger the success of the whole undertaking.

The new Equitable Building represents an investment of $29,000,000. In land there is $15,000,000, in building $14,000,000. The land and building are owned by the Equitable Building Corporation. But equally interested with them in the commercial success of the structure are the policyholders of the Equitable Life Assurance Society, for their money is invested in it in the form of a first mortgage, the money which made the erection of the building possible. Thus the owner, the representative of the mortgage holders, the general contractor and the architect have been the four chief parties in this work. Each, to guard his own interests and assure himself of his own profits, has had to guard the interests of the others and assure them of their profits. "All for one, one for all," might well be the pledge of these musketeers of industry.

"I attribute our wonderful success to the Method of Procedure," Mr. Tinsley told me. As the key to this plan he spoke with authority.

This Method of Procedure provides in a very simple way for any exigency that may arise, by designating the relation that each of the four parties chiefly concerned in the work shall bear to each other and to the whole, It was formulated before the first spade of earth was dug for the foundation and it has not been changed in a single particular. It makes the superintendent of construction for the owner, the Equitable Building Corporation, the chief of staff of an industrial army. Every movement of that army is passed on by him finally before it is made. Or in a business sense, he and his office are a clearing house for all the manifold details, the manifold problems which confront the heads of the divisions into which the work is divided.

The Equitable Life Assurance Society, as the agent of the mortgage holders, has its own staff of engineers. Any recommendations they may make go to the superintendent of construction for the owner. From him they go to the architect. From the architect they go to the general contractor. The architect has his staff of engineers. Their recommendations and reports go to the superintendent of construction for the owner. The general contractor reports the progress of the work or any problems that may confront him to the architect, who presents them to the owner's superintendent. The general contractor deals only at first hand with the architect. The superintendent of construction has his own staff of engineers.

Hand in hand with the work of the construction department goes the work of the operating and renting departments. The Equitable Building is not an advertisement. It has not been built for show. It has been built for profit. The lenders on mortgage lent for profit, not to help construct an advertisement. And inasmuch as the ultimate source of profits lie in renting and cost of operation, it is important that the operating and rental departments point out, as the construction work progresses, how it will affect their departments, what changes should be made to increase the efficiency of their departments. The heads of these departments also lay their recommendations before the superintendent of construction for the owner.

Every Wednesday since the beginning of the work the representatives of the owner, the architect and the general contractor have met in the office of the Equitable Building Corporation. With them have gathered their heads of departments and the consulting engineers and experts employed on the specific parts of the work such as heating and ventilation, foundation, steel work, ele-

vators, fire prevention, power plant, etc.

All changes that have been suggested, any and all problems that have presented themselves are in the hands of the owner's representative for the Wednesday meeting, having been submitted by the procedure already explained. Such changes or problems as call for discussion are discussed and the composite view of all those affected by them is obtained. This is necessary because there are few changes or problems which affect solely any one part of the work. So dovetailed are its integral units, so dependent is the whole on its parts, that, like the human body, a change in one member affects the whole fabric.

These meetings are official. Direct action can be taken only in accordance with the terms of the Method of Procedure, which specifically states that the meetings are official. The meetings give Mr. Horowitz, of the Thompson-Starrett Company; E. R. Graham, the architect, and Mr. Tinsley and their engineers and lieutenants the opportunity to go more fully into the details of subjects which have previously been placed before the owner in letter or report form. The man to man point of view is obtained as a corollary to the typewriter. An average of twenty-five men attend these meetings, and each one receives a copy of the minutes, so that he has always at hand a weekly record of these proceedings. Copies of these minutes are sent to General du Pont, to all those whom their subject matter concerns in any way.

It is the duty of the architect under the plan of procedure to issue all stop orders on account of contemplated changes; to issue all requests for estimates of the cost of contemplated changes; to issue all acceptances or injections of contemplated changes and to issue all releases on stop orders. It is the duty of the general contractor to submit to the architect all sub-contracts, estimates and recommendations, preliminary estimates, proposals for additional work and drawings and samples submitted by sub-contractors. He is required to install a complete system for the thorough checking of all labor and materials, and for inspecting and expediting work at the shops of sub-contractors.

The suggestions of the various consulting engineers are taken up by the superintendent of construction for the owner and by the architect and are brought to the attention of the general contractor only when the subject matter is fully determined.

I write of this Method of Procedure in the present tense because it is still in force and will be for some time to come —at least until after May 1, when the building will be open to tenants.

Changes in the contract or specifications must be approved by all the parties to the contract, including the Equitable Life Assurance Society, before becoming binding, and when so approved become amendments to and a part of the original contract.

The Method of Procedure is the first part of the team work. It fixes the place of the players, tells them their duties and gives them the signal code. The second part is the actual playing of the game.

The Equitable has been what is known in building parlance as a "wagon fed job." That is to say, there has been no place to store material. City ordinances have prevented the use of the streets for storage purposes. Therefore it has been necessary for the material brought to the site by wagons and motor trucks to be placed in position at once. And not in any old position—in the exact and final position called for in the architect's plans. Enter the time schedule.

The general contractor fixed the time schedule, a reproduction of which herewith appears. In this schedule a time is set for the completion of the building. From that there must be no deviation. That date will not stretch. A time is also set for the completion of each of the many parts into which the work is divided. In this some elasticity is allowed—strikes, weather, accidents and acts of God are recognized as possible factors of delay.

It has been strictly up to the general contractor to see that this schedule was adhered to; to see that his own men and the sub-contractors and their men or material were at the site on schedule time. Eliminating speed, no railroad or subway time table was ever more carefully mapped out, watched and adhered

A1—

TIME SCHEDULE

THOMPSON-STARRETT COMPANY

1st Rev.

CLASS OFFICE BUILDING EQUITABLE No. DATE 4-28-14

OFFICE SCHEDULE: ARCHITECTS DRAWINGS TO LET CONTRACT	OFFICE SCHEDULE: CONTRACT MUST BE LET ON OR BEFORE	OFFICE SCHEDULE: ALL DETAILS FOR SUB-CON.		JOB SCHEDULE: START	JOB SCHEDULE: FINISH
			1 STEEL DRAWINGS		
			2 ARCHITECT'S DRAWINGS		
			3 WRECKING		
			4 EXCAVATION		
			5 DRAINS AND WATER		
			6 CAISSONS—PILES		
			7 FOUNDATIONS—CONCRETE		
			8 WALLS TO GRADE		
			9 WATERPROOF—WALLS		
			10 GRILLAGE—COLUMN BASES		
			11 STEEL ERECTION—STACK		
			12 ORNAMENTAL IRON—STAIRS—PLAIN		
			13 " " FINISH		
			14 ELEVATORS—GUIDES—TEMP. CAR		
			15 " CAR—SIGNAL—TEST		
			16 BOILERS—TEMP. HEAT		
			17 PUMP—TANKS		
			18 ARCHES		
			19 PLUMBING—GAS—ROUGH—TEST		
			20 " FINISH—FIXTURES		
			21 HEAT—VENTILATION—ROUGH		
			22 " —REGULATION—FINISH		
			23 ELECTRIC—ROUGH—TEMP. LIGHT		
			24 " FIXTURES		
			25 COMMON BRICK—MASONRY above grade		
			26 GRANITE		
			27 BLUESTONE		
			28 LIMESTONE—MARBLE EXTERIOR		
			29 TERRA COTTA		
			30 FACE BRICK—ENAMELED		
			31 SPECIAL BRICK—MOULD—FIRE—HOLLOW		
			32 WOOD FRAMES—SASH—PULLEYS		
			33 METAL FRAMES—SASH—PULLEYS		
			34 WEIGHTS—CHAINS		
			35 GLASS		
			36 ROOF COVER		
			37 SHEET METAL		
			38 BUCKS		
			39 STRIPS AND FILL		
			40 PARTITIONS AND FURRING		
			41 GROUNDS AND LATH		
			42 PLASTER—PLAIN		
			43 " ORNAMENTAL—CAEN—SCAG		
			44 MARBLE WALLS—TILE		
			45 " FLOORS—TILE—MOSAIC—TERRAZZO		
			46 HARDWARE—FINISH		
			47 TRIM—WOOD		
			48 " —KALEMEIN		
			49 PAINT—DECORATIONS		
			50 FINISH FLOOR—WOOD—CEMENT		
			51 PAVING—SIDEWALK—CURB—BMT. FLOOR—W. P.		
			52 REVOLVING DOOR		
			53 MAIL CHUTE		
			54 VAULT WORK—BANK		
			55 SWEEPING—PNEUMATIC electric		
			56 SPRINKLER		
			57 ICE PLANT		
			58 LAUNDRY—KITCHEN		
			59 ENGINES—GENERATORS—MOTORS		
			60		
			61 Sidewalk & Curb		
			62		
			63		
			64 FINISH BUILDING—SCHEDULE TIME		
			65 " " CONTRACT TIME		

ORDER

Time Schedule form under which the Equitable Building was erected.

to than the Equitable schedule. Each manufacturer of supplies, equipment or material had his schedule—the day on which his product must be at the site. If it wasn't there, there was delay, a break in the schedule, delaying other parts of the job and idle men. If, on the other hand, No. 1 job, for example, was delayed, and the material for No. 2 job was at the site on the date set, there was no place to put it.

For example, take the foundation and the steel work. The steel work is the axis of any modern skyscraper. The general contractor does little worrying after that takes place. Everything revolves around it. The stone work, the walls, the floors, arches and ceilings are simply curtains to protect the tenant from heat and cold. The steel skeleton is like the skeleton, the bones of the human body on which the flesh is put and attached to which are the various organs. Now there are 32,500 tons of steel in the skeleton of the Equitable Building, and in accordance with the general contractor's schedule the steel for the foundation work and for each floor was to be delivered on a certain date. If the foundation was not ready for the placing of its steel and the steel arrived on the day set what was to be done with it? It couldn't be stored on the sidewalk. It couldn't be stored in the building, there being no building to store it in. So, the foundation work simply had to be ready for its steel when that steel arrived. And it was.

The same condition applied to each floor. If the steel work on one floor was not in place by the time the steel for the next floor came, there was no place to put it. And again it had to be. Nothing short of an earthquake could be allowed to interfere with erecting the steel work absolutely to the dot on the schedule. With the steel skeleton up, there was a chance for some elasticity in the placing of other work which followed.

Just as the Plan of Procedure divided the responsibility of the principal parties to the contract into zones, so the general contractor divided his work on the building into zones. Each zone had its army of workers, the entire force ranging with the employes of sub-contractors from 3,500 to 2,500 a day, and its superintendent.

Each superintendent in turn has his lieutenants and foremen. With the Method of Procedure and the time schedule operating as they were designed to operate, the rest has been comparatively automatic, for with the steel skeleton up the "trimmings" follow in regular sequence. As the steel work has been completed on each floor, the floor arches and mason work for the exterior and interior—granite, terra cotta and brick—have been reared around it. The mason work has been four stories behind the steel work to prevent the vibration of the riveting of the steel columns from affecting it. Next came the concrete and cement floors, the mechanical plant, the iron stairs, the elevators, the ornamental and bronze work, corridor marble and floors, steel doors and the heating and ventilating plant.

Understand that in the later stages of construction, the time schedule having been followed, the work on the stories first started has been practically completed before the mason work has been placed on the upper stories. That is why the power plant was in operation and furnishing steam for the lower stories before the mason work was complete on the last two. As soon as the basements were completed the mechanical plant was installed. The work has been progressive, not only as a whole but on each floor, the time schedule calling for the completion of all work on each floor being so arranged that there has been no retracing of steps. Thus when the mason work of the last story was completed the entire work on practically every floor beneath it was done.

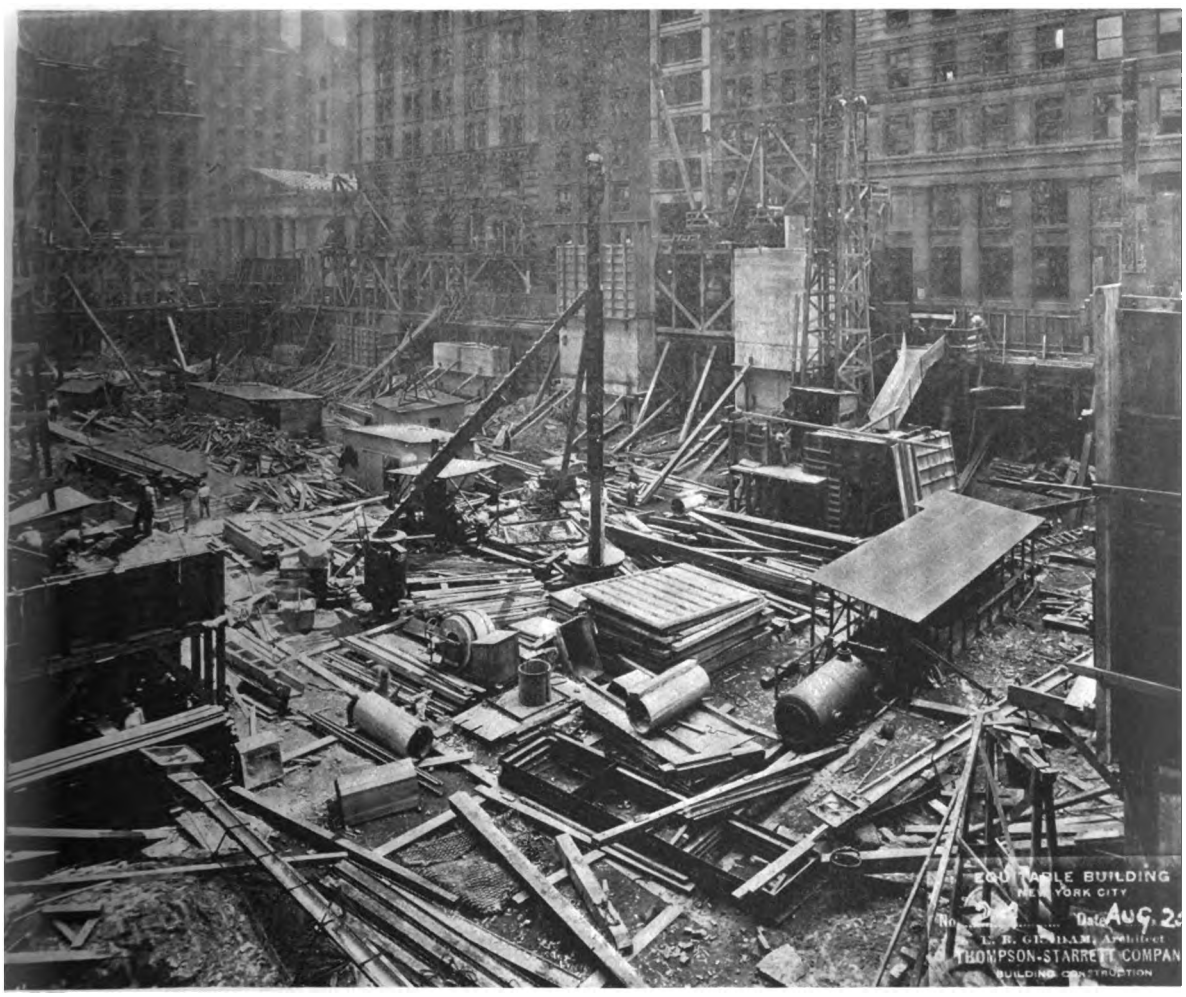
Each day's work has been checked by four different sets of engineers, those of the Equitable Building Corporation, those of the Equitable Life Assurance Society, those of the architect and those of the Thompson-Starrett Company. These engineers have made complete surveys of the construction work, each acting as a check on the other and on the whole. Each has made his report to his department, and all, under the Method of Procedure, have been collated by the Building Corporation's superintendent.

The Old Equitable Building
Before the Fire.

The Old Equitable Building.
After the Fire, Jan. 15, 1912.

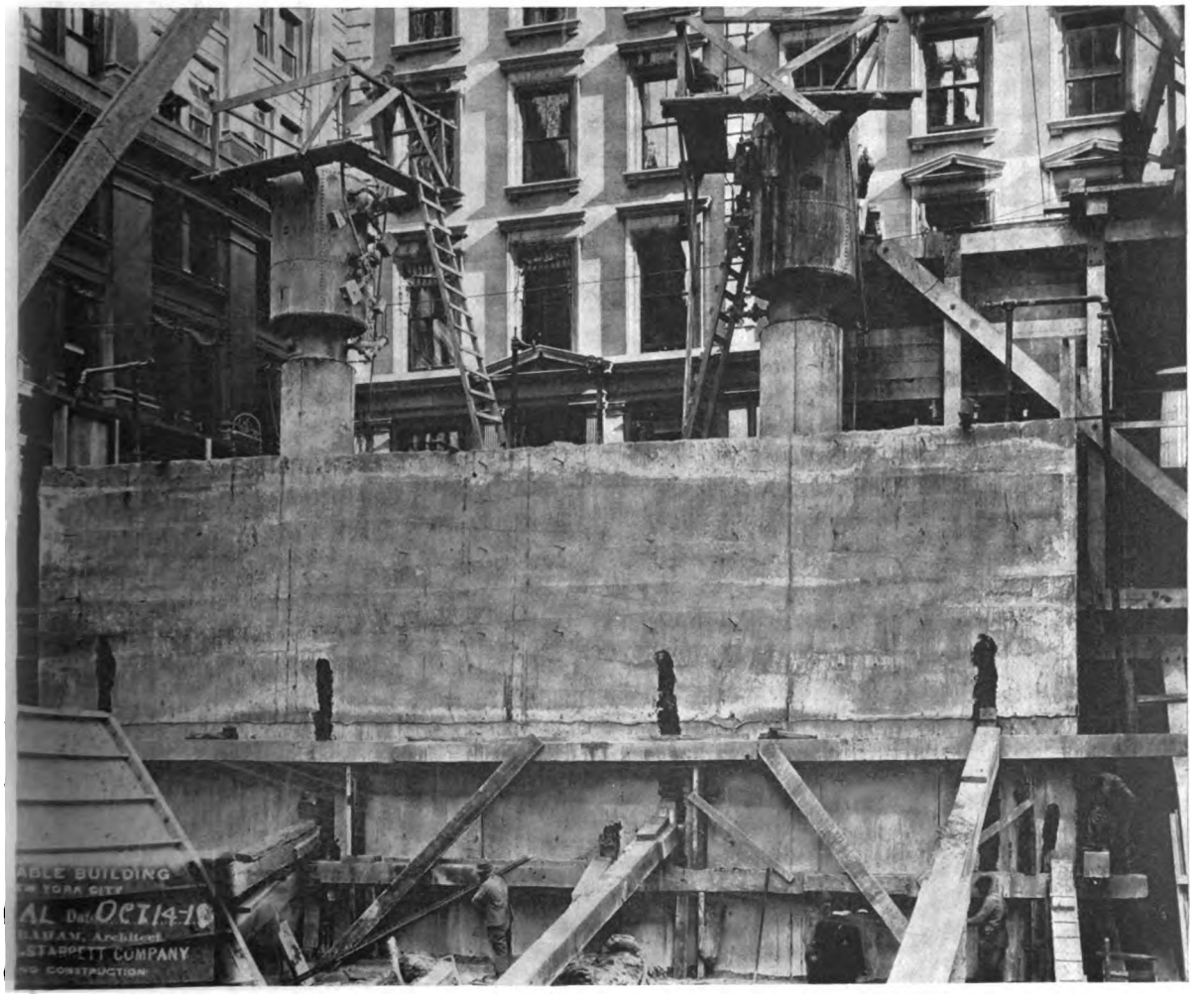
December 23, 1913 — The Excavation Work Started.

July 9, 1913—Surface Stage of Ex
vation at Second or Sub-baseme



August 25, 1913.—Caisson work in progress. Concrete piers are here seen in four stages of construction. At the extreme right, Pine street side, is a full section of a built-up pier, ready for sinking. At its left is a partly built-up pier. Next to this is one-third of a pier completed. At the extreme left are shown the forms for the first and third sections of a pier.

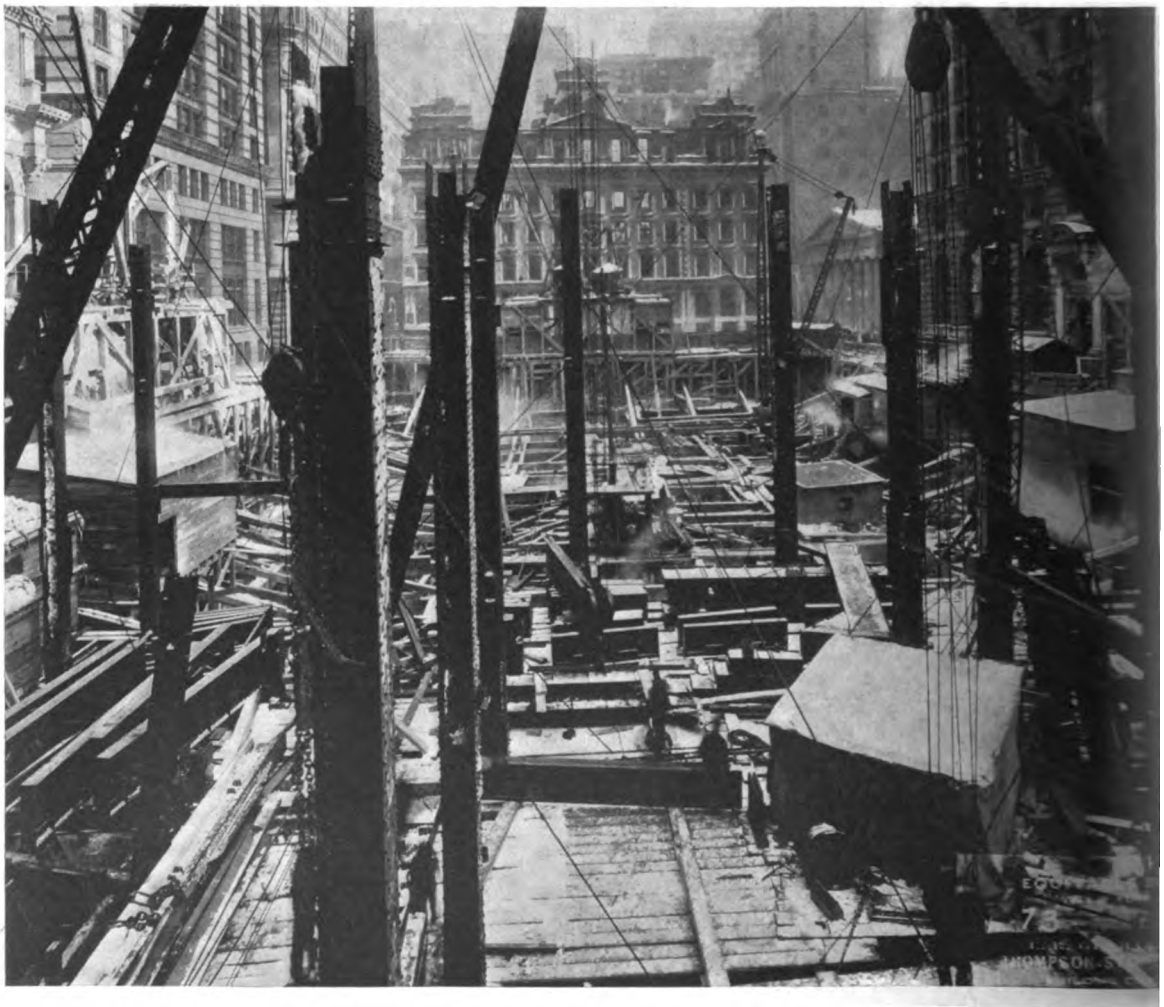
October 6, 1913 — Firs
Interior Pier Being Sunk



October 14, 1913—The Longest Caisson Ever Built. This a Double Caisson. The Caisson is Being Sunk.

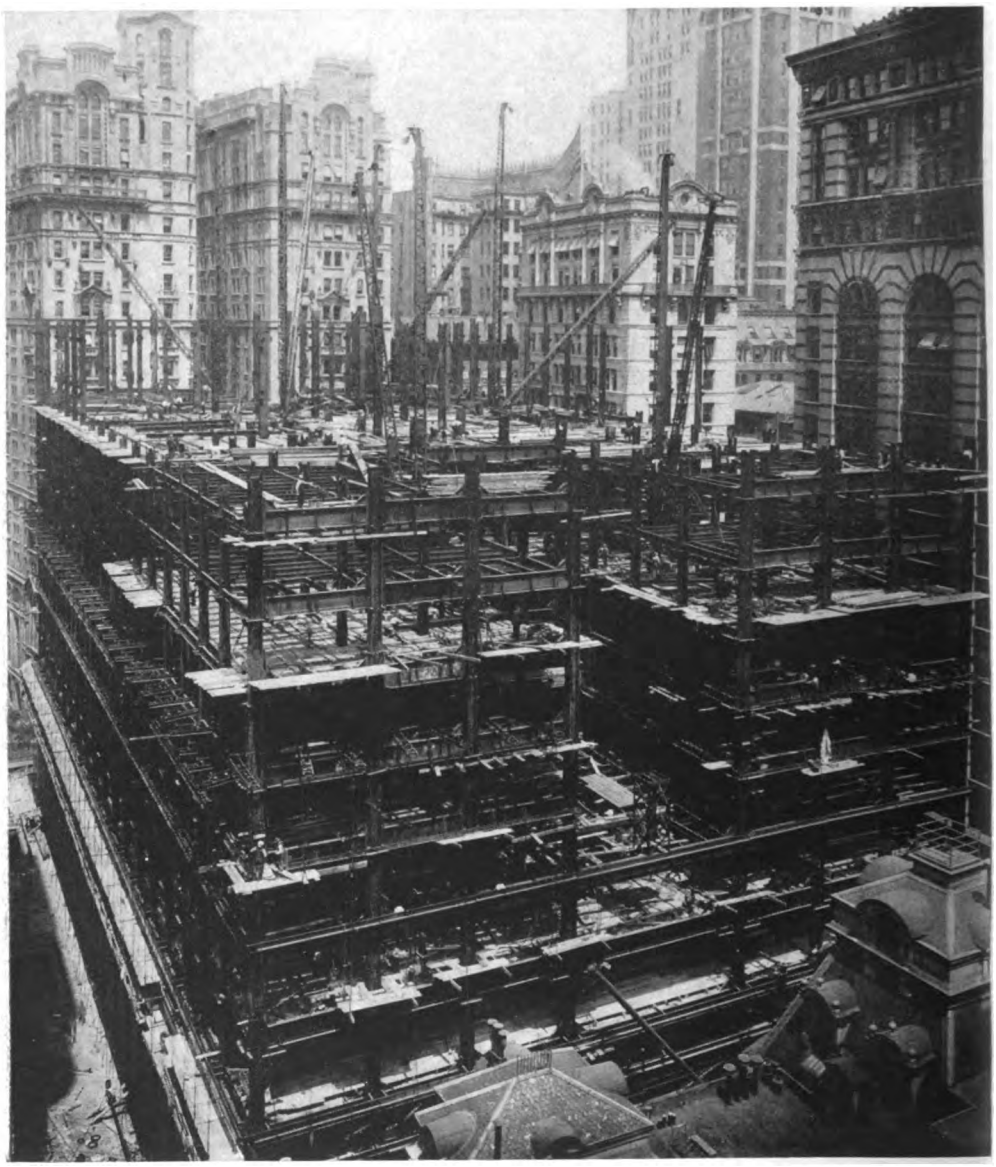
December 2, 1913—Bracing for Exterior Piers During Excavation. This Bracing Keeps the Buildings on Pine and Cedar Streets from Pushing in the Cofferdam Wall on the Four Sides of the Buildings.

January 6, 1914.—View of bracing during excavating which has reached the sub-sub-basement. The upright supports maintain the strength of the cross supports which prevent the foundations and walls of the buildings Pine and Nassau streets from knuckling.

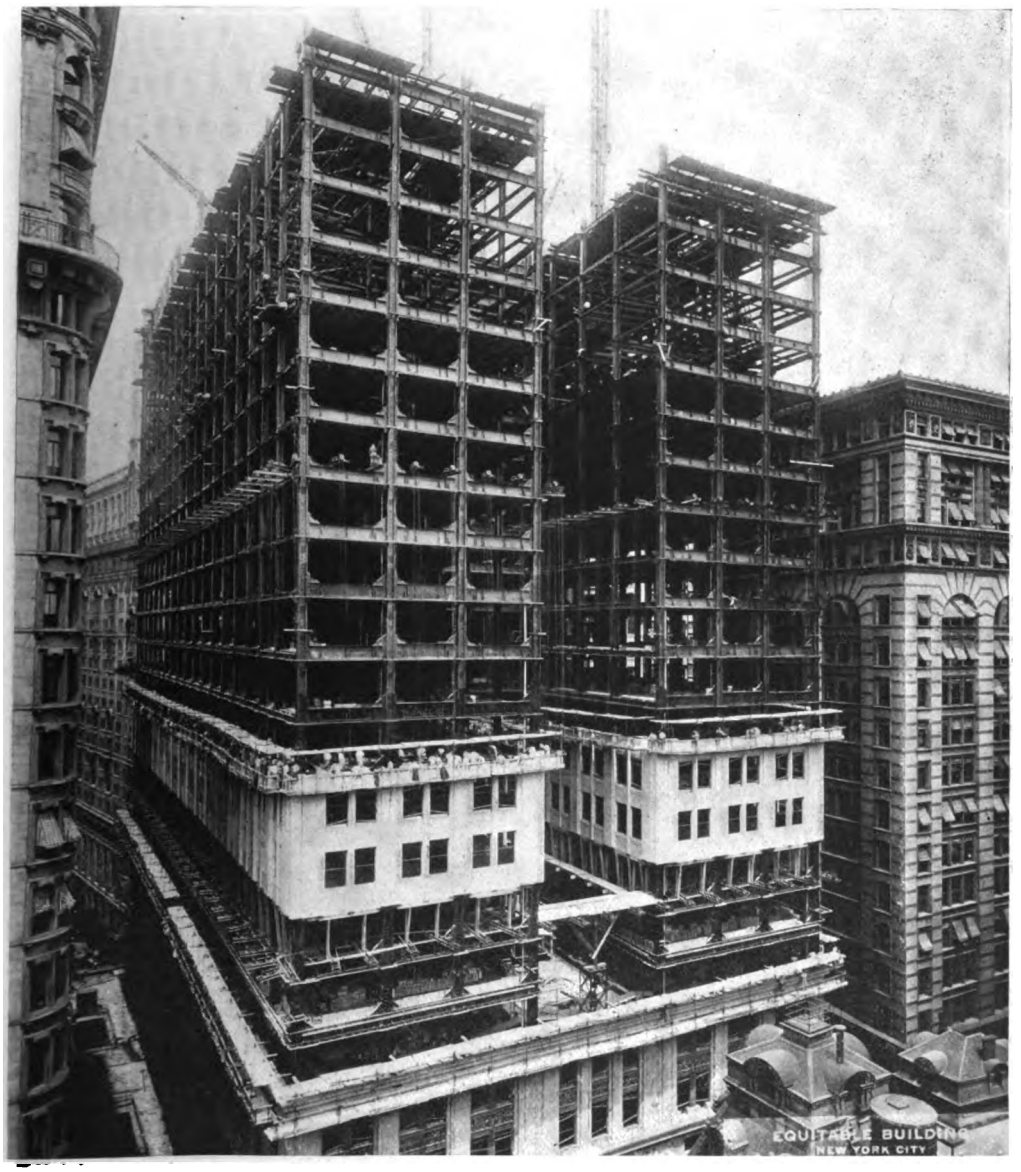


February 24, 1914—Steel columns first rising above street level. The full tonnage of the steel to the stre level was in place on March 10. Because of the conformation of the plot the steel construction first sho above the ground at the points indicated.

April 11, 1914—Beginning Stone Work. Steel Skeleton Up to the Fifth Floor.



May 25, 1914—Steel Skeleton Built to the Eleventh Story.



July, 1914—Nassau Street Front, Showing H Plan and Terra Cotta Brick Up to Tenth Floor.

July 23, 1914—The Halo Picture. The Halo is Formed by Escaping Steam from an Adjoining Building.

August 17, 1914 — Top of Steel Skeleton Completed on Street Line.

September 14, 1914—The Fortieth Story is Level with the Observation Platform of the Singer Building and Above the Top of the Bankers Trust Building

September 14, 1914—Exterior Completed to Top of Pent House Roof, Save for Twenty-seventh and Twenty-eighth Floors.

December 23, 1914 — Exterior Completed One Year from Beginning of Excavation.

Renting the New Equitable Space

The Parts Played by the Renting Manager and the Rental Schedule

By Thomas Morch

Renting Manager of the New Equitable Building

The Renting Manager was engaged and the rental schedule prepared for the new Equitable Building before the final plans were adopted. And it was not until the renting manager had criticised those plans and prepared a rental schedule showing the revenue to be derived from the space that the actual work of construction was begun. In other words, the Equitable Office Building Corporation knew before it finally committed itself to the erection of the equivalent of a thirty-eight-story building what that building would produce in rents and what relation the rents would bear to the cost of land, building and operation.

The Architect may plan a perfect building. The General Contractor may build it in every detail in accordance with the plans and specifications of the Architect. It is up to the Renting Manager to sell what they jointly produce.

Unless he can sell the space, which is equivalent to selling the service, the investment is a loss. Unless he knows in advance of completion just what the space and service are to be, he cannot intelligently advise the owner whether rental prospects are good or bad. Unless he sits as an adviser, purely from his end of the game, in the conferences among owner, architect and general contractor while construction is going on, and unless his counsel is taken, the space and service may be so changed as to impair their selling value.

Mr. Morch was chosen as Renting Manager for the new Equitable Building by General Dupont. His task was first to prepare a Rental Schedule which would show, in advance of construction, whether or not the building proposed in the preliminary plans would be a profit payer. This being decided it was his duty to sit in the councils as construction proceeded, give his expert opinion on proposed changes affecting his department, and as the work went on prosecute his space selling campaign, which included charge of the publicity and advertising.

His long experience in renting downtown property and the fact that he had prepared rental schedules for many of the largest buildings in that section fitted him for his work.—EDITOR.

The renting manager of today, to be successful, must be more than a mere salesman. In no business in New York city is there keener competition than in that of renting space. He, of course, must be a top-notch salesman, but that is the lesser part of the necessary equipment. He should know, before his space is ready for sale, the amount and kind of space occupied, and the nature of the business occupying it in every building containing the kind of tenants he wishes to place in his building. He should know all there is to be known about this space—its size, location with regard to light and ventilation, floor location, situation with regard to elevators; in short, every feature of its architecture, construction and the service it receives from any and all of the operating ends of the building. Furthermore, he should know who are available as tenants in the district, that is the occupiers whose leases expire on the first of May in each year.

The necessary equipment for the renting manager having been defined, the next step is to apply that equipment to the preparation of the rental schedule for the largest office building in the world. The land and building alone represent an outlay of $29,000,000. The making of the rental schedule called for the appraisal of a rental area of 1,200,000 square feet.

I have made it a rule to eliminate entirely the square foot method as a basis in my estimates of space value, and the space in the New Equitable Building is not being sold by the square foot method. The square foot method of estimating rental values and fixing rents, as a rule, is unfair to both owner and tenant. Only after considering the cost of the land, the cost of construction per cubic foot, the character of the service to be rendered and the divisible possibilities of the space is it feasible to arrive at a correct estimate of rentals and calculate the income. Every thoughtful investor will realize the force of this argument and understand that he should know definitely the cost of the proposed building, the income, the operating expenses and the net margin of profit his investment will yield before he spends a dollar.

And every tenant should realize that the owner who knows at the start that his investment is paying dividends gives better service than the owner who has to skimp on service to meet the decrease in income on an investment whose returning power he had miscalculated.

The soundness of this method has become more and more apparent to me as I have compared the disappointments caused by the ancient methods with the satisfaction gained by knowing beforehand that interest and profit were certain.

I have known of buildings where an arbitrary rule prevailed, calling for the renting of space by the square foot without regard to light, shape of space or operation of elevator service. In these buildings the earliest tenants received priority in the selection of space, thereby leaving the less desirable space for those who came afterward. The result was that the tenants who came first and selected the best spaces made long leases and the less fortunate signed for shorter terms. In course of time, when the renting manager called upon the early tenants for renewal of leases at a just, that is to say a higher, rental, the advance was fought and it was not an easy task to induce the late tenants, who had the less desirable space, to renew their leases, even at the old prices.

The rental schedule of the New Equitable Building was compiled on such lines as I have described, and proved to the entire satisfaction of the owner that the building would be productive of a reasonable return on the investment. In making my calculations for an exact and unalterable schedule I took into consideration the following factors:

First—The location and cost of the land and building.

Second—The character of the service.

Third—Whether the rooms received natural light from the north, south, east or west.

Fourth—The outlook on each side.

Fifth—Height of ceiling in each room.

Sixth—Height of adjacent buildings.

Seventh—Operation of elevator service.

Eighth—Depth and width of rooms, with a view to subdivision for convenience and light.

Ninth—Number of windows to the space.

Tenth—Proximity and accessibility of rooms to elevators.

In preparing this rental schedule I used a typical floor plan, divided into units. The value of every room was appraised in its relation to light and location in the building and situation with regard to the service of the building, convenience and accessibility. Previous to this the general lay-out was carefully examined and criticized by all concerned, and the plans from which the schedule of prices was prepared represented the condensed judgment of all. The result was a building which will give to the tenant greater advantages than any other.

Should a tenant desire to occupy an entire floor the arrangements of stairs, elevators and other utilities is such as to give him continuous, unbroken, daylight space on all four sides of the building, and all properly connected with the central lobby. The Equitable Life Assurance Society will occupy several such floors.

In these modern days every new building is built for its tenants, and space is offered without division, division being made to suit the demand of the tenant. But the Equitable Building Corporation has taken a new and long step forward in showing tenants how their space can be conserved, how more service and better facilities for doing their business can be had at a cost as low or lower than that paid for less space and inferior service and facilities.

The New Equitable has been built upon *efficiency* as a basic principle. Efficiency spells profit for the owner by spelling conservation and improved service for the tenant.

Co-operating with the Renting Department is an Efficiency Department, which was created to aid prospective tenants in making the most economic and efficient lay-outs, i. e., to save space, to save rent and at the same time to secure the utmost possible efficiency from their working forces by applying the usual principles of efficiency engineering as related to office organization—the most convenient grouping of departments and disposition of clerical forces. This department is in charge of Mr. Henry W. Herrman, a well-known professional efficiency engineer of wide experience in office organization work.

The Renting Staff gets in touch with a prospective tenant. "I am using too much space where I am—I want to reduce my overhead charges," says this man or firm; or "we realize that there is too much waste space in our present lay-out; we don't want to move unless we can materially better our arrangements."

"We can show you," says the renting man, "just what you need and how to get better space, better facilities and increased efficiency in your lay-out—perhaps we can make a material saving in your rent. Let us have our Efficiency Department make a survey of your offices and prepare a plan?" "We don't wish to obligate ourselves by asking for such extensive service," says the prospective tenant. "There is no obligation, we assure you," says the Renting Man; "this is our *new service*—we have nothing to sell until we know your needs, then we will make you a proposition that will interest you, because you will know that if you come with us, you will have an efficient lay-out, that you will get maximum results in the minimum space, therefore, that the proposition will be quite as profitable to you as to us." "All right, go ahead—show me what you can do," says the tenant-to-be.

Here, then, the Efficiency Department takes up the work, calling upon the prospective tenant, getting from the proper officer or member of the firm the ideas that they wish embodied in the plan, making a survey of the present offices, noting all the important factors—the number and relation of departments, the routine and transit of the work, the proximities required, the conditions of space required, waste, if any exists, congestion, if any, new facilities required, present handicaps to be removed or advantages to be maintained—in short, a comprehensive study, on efficiency lines, of the actual requirements of the tenant's office, unit by unit, and as a whole.

Panel in Ornamental Terra Cotta, by Federal Terra Cotta Company.

Terra Cotta as an Improvement on Ornamental Iron

As Exemplified in the New Equitable Building

By F. A. Austin

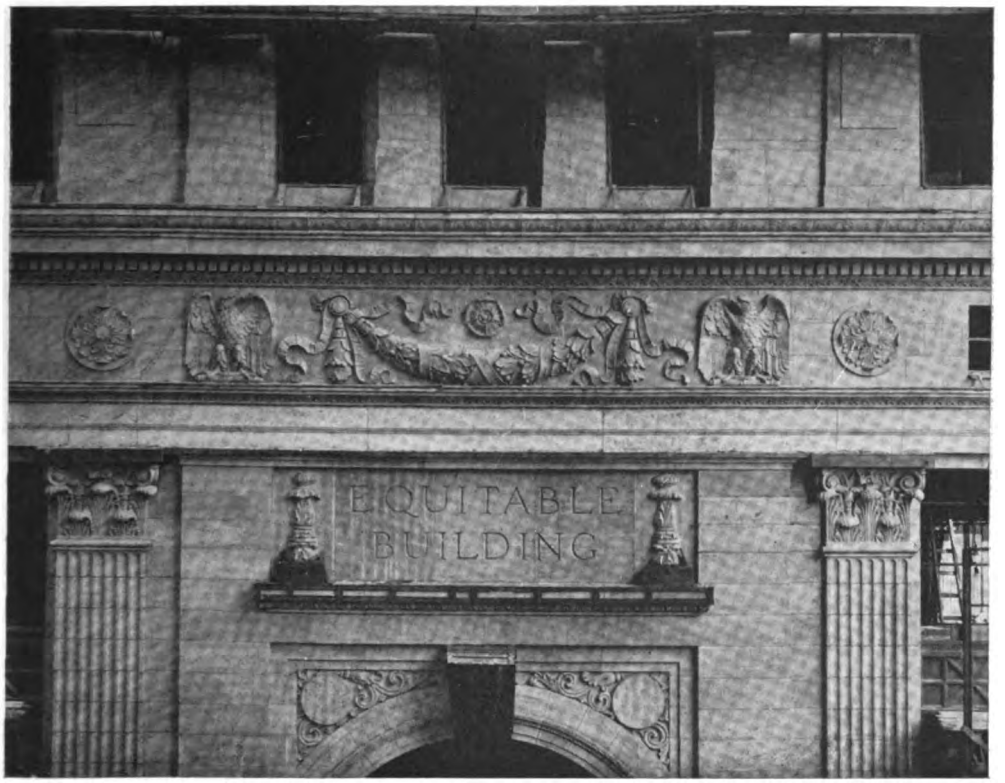
PARADOXICAL as it may seem, one of the principal features of the most modern office building in the world is the most ancient, so ancient that it dates back to 4,000 years before Christ. This feature is architectural terra cotta. You have read of fabulous prices paid for a painting by Della Robbia. Probably few of those who possess Della Robbias know that the Della Robbia family for generations back of that member who made the name famous with his brush was noted for its production of ornamental terra cotta.

In fact few of us are aware that the modern use of terra cotta bridges a gap of centuries between the old world and the new and that in the ever-increasing application of ornamental terra cotta to all types of structures the architect of the Twentieth Century is merely going back to the days of the Renaissance in Italy, to the days of the Borgias, the Medicis and Michael Angelo.

There is only this difference between the use made of terra cotta by the architects of Italy's most renowned structures and the architect of the modern skyscraper. They used it only for ornamental purposes. He applies it to structural as well as ornamental work.

Would it stagger you a bit if, after you had gone through the terra cotta room of the British Museum and seen there specimens of terra cotta from Greece and Rome dating back from 1,000 B. C. to 100 A. D., you were told that

Frieze in Ornamental Terra Cotta, by Federal Terra Cotta Company.



The new Equitable Building front, showing Federal Terra Cotta ornaments used in place of ornamental iron and in connection with granite.

terra cotta was not used to any noteworthy extent in the United States until 1876? And yet it is the truth.

With the fall of Babylon there was some crash of terra cotta. In the Metropolitan Museum of Art you will find *baa* reliefs of Assyrian sheep and illustrations of the Bacchus Cup races which were a feature of the Phoenician yachting season. The ancestor of the Greek who supplies you with hot peanuts was a worker in terra cotta, and the forbears of the person who sells you bananas or puts a bomb on your doorstep as the whimsy may seize him, with their characteristic aptitude for the polite assimilation of their neighbors' goods, had decorative panels of terra cotta in their homes, terra cotta tiles on their roofs, and terra cotta cornices and crestings for their palaces, taken from the mansions of Greece. According to Tacitus, terra cotta frieze out was a favorite game with the builders of Nero's time.

Terra cotta, getting back to prep school days and the veni, vidi, vici stage of adolesence, is the English translation of two Latin words meaning baked earth. The Egyptians and the gentlemen who mussed up the Queen's English on the first effort at skyscraper building, the Tower of Babel, got no farther than plain, baked earth in depicting customs and times of Rameses and Cheops. It remained for the Etruscans to put the paprika to the baked earth and give it a dash of color. To the Greeks belongs the credit of producing the first enamelled terra cotta glazes in colors and in the Italian Renaissance, which symbolized the search of the artists of the period for the lost spirit of Greek beauty of form and color, were produced specimens of ornamental terra cotta superior in form and coloring to those which furnished the models.

Those who have studied them will tell you that the master work of the Della Robbias in colored terra cottas has been imitated but never equalled. Much of the ornamentation of the Alhambra is done in terra cotta, and all over Spain

Federal Terra Cotta Eagle Over Main Entrance.

and Europe are to be found the terra cotta work of artists and designers of the Fourteenth Century. Likewise the edifices of Fifteenth Century France show many examples of decoration in this material.

So much for the ancient history of a modern material. The Chinese invented gunpowder and chop suey long before the present rage for war in Europe and the popularity of chow mane in New York. That's a matter of turning the clock back. What the builder and owner and manager of today, or he who is looking with favorable eye on an investment, be it of time or money, which will make him a builder, or an owner or a manager, looks to is turning the hands of the clock forward to dividend day—when the interest on his investment is paid. And it is with reference to the effect of architectural terra cotta in increasing the amount of this dividend that the meat of this article has chiefly to do, as exemplified in its use on and in the new Equitable Building.

Architectural terra cotta takes the place of ornamental iron on the exterior of the first four stories of the new Equitable Building. This is a new use for architectural terra cotta. Why does it take the place of ornamental iron?

1. Because it gives an effect in ornamentation equal if not superior to iron.

2. Because it will not rust, because it will not be affected by weather conditions and therefore will not deteriorate in looks or quantity.

3. Because its color and surface are permanent, because they are weatherproof and because it does not need repainting every few years.

4. Because it is fireproof; it has already been tested by the fiercest heat that can be generated.

5. Because its lightness of weight, as compared with iron, reduces the strain.

"The sand blast man will get you if you don't look out"—that's a bugabear with the building owner or manager. The sand blast man means added expense and added expense means something subtracted from dividend. The painter and the cleaner are in the same class with the sand blast man. Terra cotta has no pores to absorb dirt and dust. Its surface is glazed. The sand blast man and the painter rightfully consider it an enemy.

There are 5,000 tons of architectural terra cotta in the new Equitable Building. On the fifth and sixth and the four top stories as well as on the first four it is used exteriorly instead of ornamental iron. The color is the green of ornamental iron. Only the man who pays the bill for maintenance knows that it is not ornamental iron. And he knows it to his joy.

The ignorance of the average man concerning terra cotta is a marvel. He thinks it ends with the terra cotta blocks or the common red fireproofing blocks used for floor arch construction and partitions. Between these members of the same family there is no relation save that they come from the same material. Architectural terra cotta is used only on exteriors. Its noteworthy use on the new Equitable Building is from the fourth story lintel course up through and including the seventh story. This portion of the building, exteriorly, is erected entirely of architectural colored terra cotta, which exactly matches in tint and texture the granite of the surrounding stories. The same material is used

from the twenty-fourth to the top story. On the exterior main shaft terra cotta, used for sills and lintels, exactly matches the surrounding brick.

In the engine and boiler room cream glazed terra cotta is used for base courses and walls as a substitute for glazed brick. Its advantages here are perhaps even more obvious to the lay mind than those which distinguish its exterior use. Engine and boiler room necessarily spells coal dust and grease. It also spells heat, which, applied to some materials, means disintegration. But not so with terra cotta. Its high fire glaze, first subjected to a test of 22,000 degrees Fahrenheit, enables it to resist any degree of temperature to which it may be exposed. Its glazed surface has no pores to admit grease, dirt, dust or any substance which would gradually wear it down. Building management has become an exact science. The building manager is always seeking to decrease his overhead without sacrifice of service. Labor is a part of overhead It requires more effort, more muscle and consequently more time to clean a surface which absorbs dirt or dust, or to which they stick. Thus the use of glazed terra cotta means a minimum of expense in cleaning.

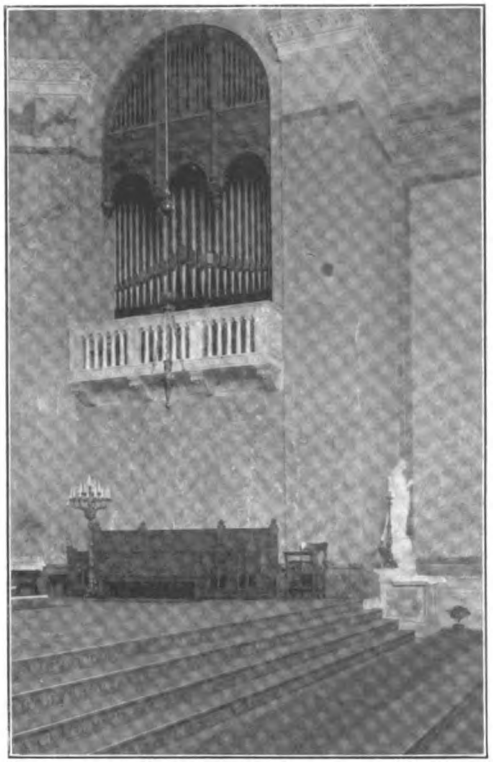
Why did the architect, the representatives of the owner and the general contractor agree on the use of terra cotta?

1. Because it gave the desired ornamentation, was lower in first cost than ornamental iron, represented economy in maintenance and permanence of original effect.

2. Because its tensile strength makes it capable of sustaining any reasonable test to which it may be exposed.

3. Because of its weatherproof and fireproof qualities.

4. Because it met the artistic requirements of the architect, and the practical purposes of the general contractor and satisfied the owner that it gave him a minimum of cost and a maximum of service.



Balcony of St. Patrick's Cathedral, Philadelphia, done in Federal Terra Cotta.

Had the mullions and spandrels of the Equitable building been made of ornamental iron, the initial cost would have been three times as great as the cost of using terra cotta, without reckoning the future expense of cleaning and repainting. Had natural granite been used where terra cotta was used, the outlay would have represented proportionately an increase of from five to seven times the investment in terra cotta.

Summed up in a paragraph, the use of terra cotta on the new Equitable Building represents this:

The smallest initial outlay, the best ornamental aspects, the lowest cost of maintenance and the best fire protection.

Up Go Fifty Thousand People

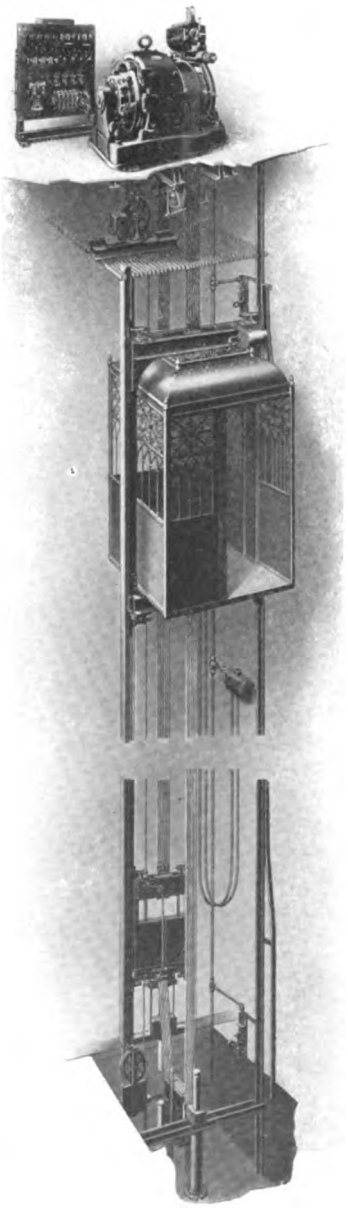
Speed and Promptness -- But Safety First

By Fred Arnold

THE elevator service of the new Equitable Building is designed to be the most perfect, complete and efficient obtainable. The height of the new Equitable Building was largely determined by the elevator service.

The first fact would be dismissed as self-evident by the average man. The second is not known to one in ten thousand, for the arrangement of the 48 cars with a carrying capacity of 3,000 persons every fifteen minutes, if need be, is in direct contravention to the practice which has been followed by architects, builders and owners of office buildings for years.

The custom, which has become a fixed habit, followed by architects, builders and owners almost since elevators first came into use, is that the number and arrangement of elevators is determined by the size of the plot and the size of the building, both of which have been decided on in advance without regard to the elevator problem. For a sixteen-story building on a plot 100 by 100 so much elevator space is allotted, largely irrespective of the character of occupancy and the density or lightness of traffic. For a twenty-five story building on a plot 150 by 150 so much elevator space is allotted in the same way. There is no variation. The elevators are cut to fit the building.



It is as though the tailor said to his customer:

"This bolt of cloth will not furnish a suit for a man of your measurements. But I can snip a few inches off your legs and arms and fit you nicely."

That is, irrespective of service, the elevator space must be cut to fit the established size of the building.

Now, the original plans of the new Equitable Building were drawn to fit the elevator service. The elevator service was the thing to be fitted. In fact, it might almost be said that the structure was built around the elevator service. This was done because the owners realized that

the percentage of occupancy of the building would hinge very largely on the elevator service. And on the percentage of occupancy depends the percentage of profit or loss.

A man will stop while buying a cigar to chat with the clerk; he will wait ten minutes, if the bartender is busy, to get the cocktail this particular bartender only can mix; he will spend an hour at the manicure's table after his shave; he will stop to see a drunk put into a patrol wagon; he will stand on a street corner for half an hour looking at the top of a building for something which isn't there, just because other people are doing likewise; he will go out of his way six blocks to see the fire apparatus on the way to a fire; he will listen to and watch the words and antics of the street fakirs who line Broadway by the quarter hour; he will spend ten minutes telling the soda counter cashier how well she is looking today; and he will swap yarns with the traffic cop as long as the latter will condescend to listen to him. But he can't wait one second for an elevator. If he waits more than a second he is losing money—big deal off now, just because I had to wait for that confounded elevator—and he goes to the starter and expatiates on the rotten, inadequate, funereal elevator service in the building he happens to be in.

It was knowledge of this universally human trait that led the owners and architects of the new Equitable Building to go to Charles E. Knox, consulting engineer and specialist in elevators, retain him to help plan the elevator service and its installation, and say to him:

"We want the new Equitable Building to have the name of giving the best elevator service of any building in the world. It is up to you to show us how to do it. We want the answer in four days. The elevator service will determine the height of the building."

They gave Mr. Knox a plan of the ground floor and a plan of a typical floor for a forty-two-story building. At the end of the four days he gave them the plans for the elevator service for a thirty-six-story building. They were adopted. Service for tenants was the goal aimed at. The size of the plot had nothing to do with it, and the height of the building was fixed by the elevators. Now, how did Mr. Knox reach his decision, what factors entered into it? In the answers to these questions lies the exposition of why the old rule of thumb —so many elevators for so much plot and so much building—is impractical, inefficient and unprofitable for building owner and tenant.

The Factors in the Problem

FIRST, the factors entering into the problem. To begin with, what kind of tenants would occupy the building? Would there be few individuals occupying large spaces or many individuals occupying small spaces? And on what floors would there be many individuals in small spaces or few individuals in large spaces? What proportion of the tenants would be likely to arrive early in the morning and what in the forenoon? And what floors would each division be on? What would be the occupations of the tenants? How many callers would they be likely to have during the day? And on what floors would there be the most callers, meaning the most starts and stops?

On the answers to these questions depended the answers to these:

How many elevators shall there be and how shall they be grouped into banks? What group of banks shall serve certain groups of floors? What speed shall be maintained for each group? How many operators shall there be and how will their shifts be divided? What shall be the rush hour capacity for each car per period of fifteen minutes? What shall be the express speed and what the local speed? How much time will be consumed in stops and starts at each floor? What acceleration and retardation will there be at certain speeds? Shall the grouping of the cars be in banks of locals and expresses or shall it be into horizontal groups with cars running express and local in each?

There was also to be considered the loss of rentable space, fear of which is chiefly responsible for the custom of planning the elevator service to fit the building. Two elevators, including hatchway and corridor space, for in-

stance in the new Equitable Building, would mean the loss say of 300 square feet per floor of rentable area. At $2.00 per square foot this represents a loss of $450 per month per floor, or $5,400 a year. An arrangement of elevator banks which failed to utilize the full service of each car at every floor would be equivalent to a waste of elevator space and the unnecessary loss of rentable space.

It was a comparatively easy matter to determine the kind of tenants, and the character of their occupancy. Anyone who has any knowledge of the office building situation in New York City knows that the supply is in excess of the demand; that any new building must get its tenants chiefly from other office buildings by providing better service or some other inducement such as price or prestige of location. Mr. Knox had already made a canvass of the occupancy of the office buildings in the lower Broadway and financial district.

Methods of Scientific Planning

THIS canvass gave him the relative percentage of occupancy in such buildings by lawyers, financial concerns, industrial firms, etc., floor by floor, and the relation of the space occupied to the character of the tenant. By studying the elevator service every hour of the day he was able to deduce the average number of persons who would use a floor occupied by a certain character of tenants; the average number of callers who would stop at such a floor and the hour or hours at which there would be the most traffic for cars stopping at such a floor. These figures also informed him of the relative traffic density for each floor in the morning, noon and night rush hours.

For a large part of the work he was already prepared, thanks to the data and records he has been gathering for years on elevator service. There is hardly an important office building in New York City whose elevator service and operation are not included in his records, showing the information on which, as has already been set forth a scientific, practical planning of an elevator system must be based.

He first applied the data already gathered and the additional information acquired by the study of buildings adjoining the Equitable site, to a forty-two-story building. He could not work out an adequate service, such as had been demanded, for a building of that height. The same result met the application of the same principles to a forty-story and a thirty-eight-story building. A thirty-six-story building fulfilled every requirement. His final estimate was that 50,000 people a day would use the elevators of this structure as tenants and callers on tenants, and that there must be a maximum rush hour capacity for each car of 3,000 persons every fifteen minutes. He knew that the Equitable Life Assurance Society, with a huge force of clerks, would occupy three whole floors or six half floors in the new building, and he knew this meant the same kind of rush hour traffic as for instance obtains in the new Municipal building. The architect had arranged the elevators on the horizontal bank grouping plan rather than the local and express plan and a careful study of this arrangement showed that it would give the best service. The banks are grouped as follows:

How the Banks Are Grouped

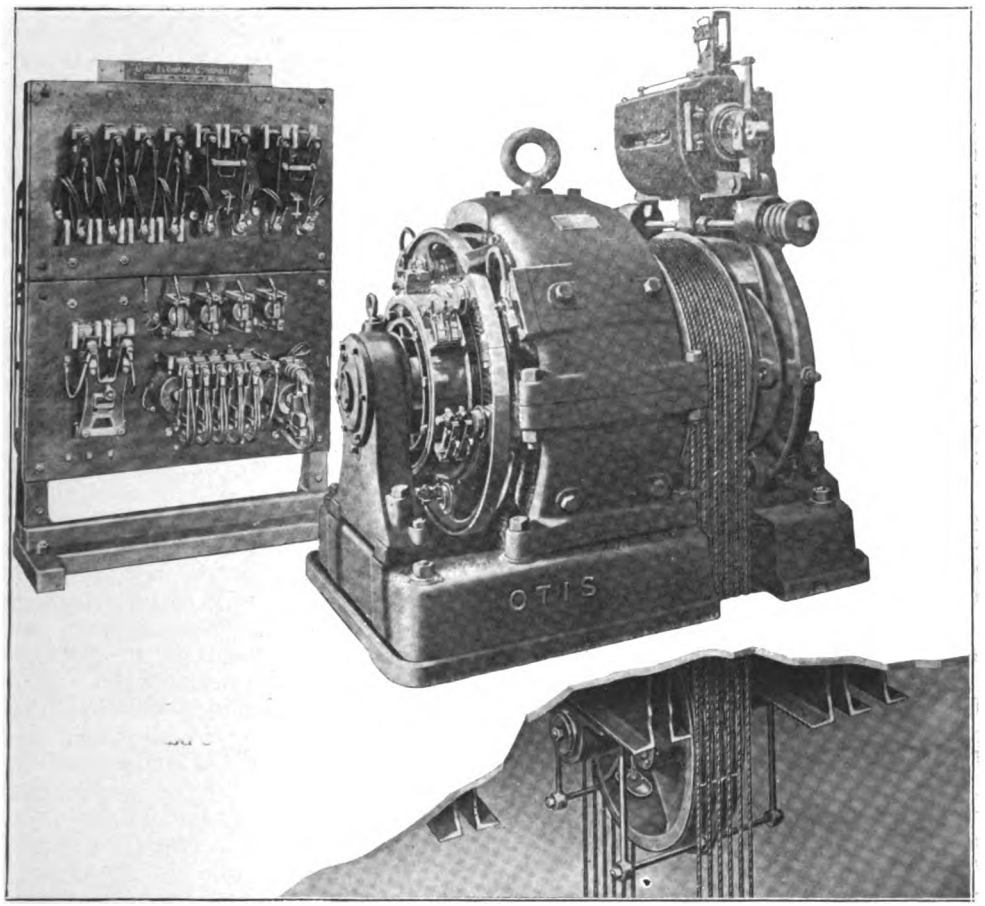
BANK No. 1, consisting of eight elevators, known as local and serving first to twelfth floors, with a speed of 550 F.P.M.

Bank No. 2, consisting of eight elevators, known as express from the first to eleventh floors, then local to the eighteenth, with a speed of 650 F.P.M. in express zone and 550 in local.

Bank No. 3, consisting of eight elevators, known as express from the first to nineteenth floors, then local to the twenty-fourth floor, with a speed of 650 F.P.M. in express zone and 550 in the local zone.

Bank No. 4, consisting of eight elevators, known as express from the first to twenty-fifth floors, then local to thirtieth floor, with a speed of 650 F.P.M. in the express zone and 550 in local zone.

Bank No. 5, consisting of eight elevators, known as express from the first to the thirty-first floors, then local to



Type of Otis 1:1 Gearless Traction Elevating Machine Used in Equitable Building

thirty-sixth future mezzanine, with a speed of 650 F.P.M. in express zone and 550 in the local.

Bank No. 6, consisting of eight elevators, all of which are local elevators serving all floors from the first floor to the thirty-seventh floor inclusive. These elevators to be used for inter-communication. This bank includes one safe lift elevator and one large combination passenger and freight car, traveling from the sub-sub-basement to the thirty-seventh floor, a rise of 546 feet 8 inches.

Bank No. 7, consisting of three elevators which are as follows:

Equitable Private elevator, equipped with a gearless traction machine, rope geared 2:1 on crosshead of car and counterweight, serving the sub-basement to the ninth floor inclusive, with a duty of 1,700 lbs. at 450 F.P.M., with a maximum duty of 2,000 lbs.

One private elevator known as Public Safe Deposit, equipped with a worm gear traction machine, with a duty of 1,600 lbs. at 150 F.P.M., and a maximum duty of 2,000 lbs., serving the three floors, sub-basement to the first floor.

One elevator known as the Empire Private elevator, equipped with a worm gear traction machine with a duty of 1,600 lbs. at 250 F.P.M. with a maximum duty of 2,000 lbs., serving the sub-basement to the third floor.

One elevator known as the Lazard Freres Private car, with a duty of 1,800 lbs. at 125 F.P.M., with a maximum duty of 2,250 lbs., serving the first and second floors, same equipped with a drum machine below.

One sidewalk plunger elevator to travel from the boiler-room to the first floor, a rise of 53 feet, 6 inches, with a duty of 2,000 lbs. at 125 F.P.M. and a maximum duty of 5,000 lbs at 50 F. P. M. This one elevator has its own private pumping plant, consisting of pumps, pressure and discharge tanks.

The summation of the rises of all of the above elevators aggregate 3¼ miles of vertical railway. There are 46 miles of ⅝-inch hoisting cables used, six cables per elevator, and an equal mileage of ropes to compensate the above cables, making a total of 92 miles of cables. There are 14.8 miles of car and counterweight guide rails used.

All of the forty-eight high-rise elevators are Otis electric elevators of the Gearless Traction type.

Safety and speed are absolute necessities for the elevator in the modern office building. The elevator system must not only be structurally perfect but its machinery and equipment must guard the passenger from the danger of his own carelessness or that of the operator. Automatic machinery must guard against the habit of many operators to start opening the shaft doors before the car has come to the floor level; or to start the car when it is below the floor level and a passenger is entering. There is none of us who use elevators whose heart has not gone to his mouth on many occasions when an absent-minded passenger who has neglected to call his floor starts to jump out with the doors partly closed and the car in motion; or when a man in a hurry, seeing the doors not closed, attempts to leap in with the car going down. The sure safeguard against elevator accidents of this nature is a device which prevents the starting of the car until the doors are fully closed and prevents the opening of the doors by the operator or any other agency until the car has come to a stop at the floor level.

"Safety First" has been the ruling motive in equipping the building with elevators. The operators of the new Equitable Building cars will be picked men, chosen for their expertness and care, and they will have to pass a rigorous test before being employed. Their wages will be higher and their hours of service shorter than those of the average office building operator in the belief that thereby their efficiency will be enhanced.

In the planning and installation of the elevator system, as in all other parts of the construction and equipment work, the representatives of the owner, architect and contractor worked in unison. The general elevator plan was worked out by J. R. Furman, chief engineer for the architect, R. D. Ward, mechanical engineer for the owner and Mr. Knox.

The Late George B. Post

The Old Equitable Building

Some of the Problems Met and Overcome by Its Architect, the Late George B. Post

THE Equitable Building, designed shortly after the close of the Civil War, represents one of the earliest steps in fireproof construction. Mr. George B. Post was first asked by the owners to investigate the subject of structural iron work. He found that in the two or three old fireproof buildings many of the beams were 150 per cent. to 200 per cent. stronger than were the arches between them, and that at least twice as much metal had been used as was nesessary for strength or stiffness; or, in other words, that a 12-inch or 15-inch beam was often used when a 6-inch or 8-inch would have sufficed.

The bids for the iron work of the Equitable were procured from three iron-working firms by others, and the wrought iron beams and columns alone, not including partitions, were close to $300,000. At that time there were no formulae, and certainly no tables for computing the strength of iron beams. Before making the detail plans of the iron work for this building, which were necessary, Mr. Post was forced to obtain samples of sections of these beams, and work out their moments of inertia, and construct tables by which to more carefully decide the size of beams as were necessary.

The net result of this original investigation was that the contract was let for the iron work of the original Equitable Building for less than half of the three original bids which were made on the old haphazard specification, and the iron work for the partitions was also included in this contract. Mr. Post found that in old construction with wrought iron beams, railroad rails filled in with brick arches were used and that in the Cooper Union Building, constructed during the Civil War, was placed the first I-beam ever used. It was invented and constructed for the purpose by the late Peter Cooper.

The First Elevator

The first elevator ever installed in an office building was installed in the old Equitable under the direction of Mr. Post. The enormous height of eight floors was safely negotiated by four steam driven elevators installed by Otis Tufts of Boston and were run for nearly thirty years, or until the building was rebuilt. Shortly after the building of the Equitable, it was found that eight or ten stories was about the limit in height on account of the great size of the external piers in the lower stories.

In the old Times Building, in the Havemeyer Building and in the World Building, Mr. Post designed a new method of building construction which overcame the difficulties. This method was to support the floors on steel columns within the building lines and anchored to the piers, and to support the

walls only by the external piers, thus in these three buildings the walls and the floors have independent means of support, although the supporting beams are anchored together. The location of these extra columns was close inside of the piers supporting the walls.

The Produce Exchange, constructed about 1881, was the first building in which cage construction was used, and this was two years before the first building was completely constructed on this basis. The four office floors were constructed above the hall, and the column spacing in the hall was 40 feet by 60 feet. The heavy court yard wall with the cage construction still stands, although two years in advance of the recognized fact.

New Building Methods

Mr. Post was the originator of the idea that the contractors should place their arches as the steel work advanced. It was only with the greatest effort that he overcame the objections of the contractors. The main reason for refusing to comply with his instructions was that it was an innovation. Another innovation devised by Mr. Post was to hang the scaffolding from the windows, or other openings of the building, instead of the old method of building up an exterior shell of scaffolding from the sidewalk and enclosing the building with an unsightly and expensive structure.

Using Dead Steam Forty Years Ago

Mr. Post used to relate an interesting story in regard to a downtown office building which contained one steam elevator and many offices which were heated by stoves. Mr. Tudor, a prominent steam engineer at that time, suggested to the landlord that he furnish steam heat to the tenants in exchange for added rental equal to their cost of coal, kindling, etc. In order to escape the annoyance of handling the coal and ashes, the tenants gladly consented, and after the plan had been in operation for a year, the owner was much surprised to find that he had used less coal to heat the building and run his elevator than he had previously used to run his elevator alone. Tudor had used the exhaust steam for heating.

Making the New Equitable Building Fireproof

The Construction and Material Which Will Prevent the Spread of Flames

By H. A. Devoe

There is no fireproof building in the sense that fireproof means a fire cannot start in a building. The building never was constructed, never will be constructed, in which there could not be a fire for the reason that some one of the tenants of every building have in their space some material which is inflammable and which through accident or carelessness may be set on fire. The best that the owner of the building can do is to have it so constructed that fire cannot spread from the walls of the room in which it starts or to other parts of the building. So far as human forethought and skill in construction and the use of material and equipment tested to a degree for beyond the point of inflammability are concerned, the new Equitable Building is fireproof. For many of the facts in this article we are indebted to Safety Engineering which made a special study of the building from an expert standpoint.—Editor.

Fire made possible the new Equitable Building. The fire which destroyed the old Equitable Building was primarily due to the fact that a storeroom for a restaurant was not shut off from the surrounding space by fireproof walls and doors. Secondarily, the destruction was due to the fact that the flames reached the elevator shafts which were so constructed that they allowed the blaze to mushroom out on each floor. Thirdly, the construction was such and the material used in construction such that the heat crumbled or forced the collapse of material which it did not actually incinerate.

The first Equitable Building was completed in 1871. It was considered at the time to be as near fireproof as a building could be made. The additions, which, together with the original structure formed the home of the Equitable Life Assurance Society for so many years, were supposedly even more proof against fire. Yet all were destroyed by fire. The building which was wrecked, save for a shell of tottering walls, on January 9, 1912, consisted of five structures constructed or remodeled at different times so as to form one.

The new Equitable Building, insofar as fireproof construction is concerned, represents not only the advance which has been made in the making of fireproof materials in the last few years (and this advance is continuous) but as well the constructive lessons taught by the fire of 1912.

To begin with, every piece of fireproofing material used has been tested to withstand 1,800 degrees Fahrenheit of heat. This includes all steel, and all steel is protected by stone concrete or terra cotta. There are no cast iron columns such as those which in the old building buckled or collapsed under the heat and allowed large floor sections to collapse. All columns are steel. There are no unprotected vertical openings which in the old building allowed the flames to become an all-embracing fan.

The new building is divided into four fireproof zones or units. A fire starting in any one zone cannot reach any other, barring conditions which cannot be foreseen or guarded against. Each zone is separated from the other by fireproof walls and fireproof doors. Each zone has its fireproof stairway, and while the isolation, so far as fire spread is concerned, of each zone is complete, the tenants of any one zone can use the fireproof stairway of any other.

The Three Chief Factors

In the general fire-protective designing

of the new building three important factors of an absolutely firesafe structure were recognized to be as follows: furnishing ample means of escape and warning for those who might be in the danger zone; confining the fire not only to the floor on which it originates, but to a section of that floor; and allowing easy access by the fire department to all points around and above the blaze.

The first and greatest provision made for creating such conditions is the subdivision of the large fire area on each floor by means of fire walls, the careful planning of corridors and the relative location of elevators and fire towers. The floor plan shown on an accompanying page is the result of long and careful study on the part of engineers and architects and is undoubtedly one of the most practical fire defensive systems ever conceived.

The fire walls of 8-inch brick with corridor doors of steel divide the area into four sections. Suppose a fire should break out in the Broadway and Pine street corner of this floor. From point A following the arrows the fire wall runs to point D. B and C are pocketed fire doors which close automatically across the corridors to form an unbroken fire-resistive barrier which will isolate the flames. F designates a large fire tower containing a 6-inch standpipe with hose attachment and opening into the corridor through a doorway provided with an automatic three-point lock steel fire door, a similar tower being located in each section.

Fire Doors Held In Place.

Steel fire doors when subjected to fierce heat have been known to warp and twist away from the frame, allowing the flames to pass through. For this reason every fire door throughout this building is equipped with a three-point lock. The New York Fire Insurance Exchange would not accept any door other than those bearing the underwriters' label. In passing, it might be well to mention the fact that the Equitable building is the first office building ever built to conform in every way with the requirements and suggestions of the National Board.

B. E. Loomis, chief engineer of the firm of Marsh & McLennan, to whom the working out of all details of fire-resistive materials and devices was entrusted thus describes the basic plan of fireproof construction:

"In designing the fireproofing and fire protection of the Equitable building, it has been our aim primarily to properly cut off all vertical openings in the building and, in so doing, to use materials that we know will stand a temperature of at least 2,000 degrees.

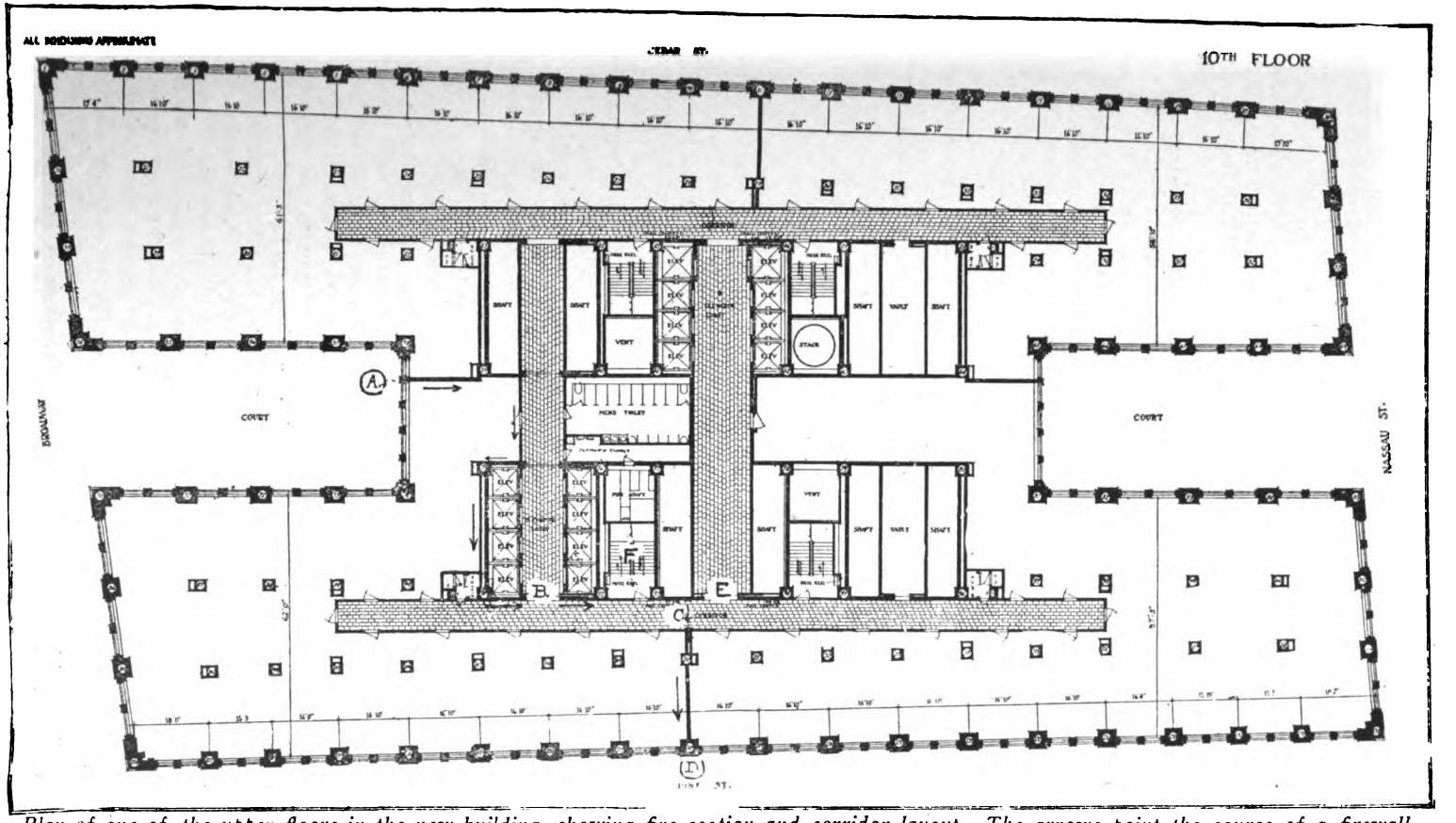
"In order to properly safeguard the lives of the occupants, we felt it necessary to divide the exits up into four fireproof corridors, all independent of each other and separated by fire walls and fire doors.

"This sub-division of the building into four complete separate buildings makes it feasible for the fire department to go up into the building in event of fire and to fight the fire either from the floor on which it is burning or from the floor above.

"The sub-dividing partitions, doors, locks, hinges, door frames, door bucks, and, in fact, every detail that has entered into the construction of this building, have been known to successfully resist temperatures equivalent to the heat of a conflagration, and every one of these details has the Underwriters' approval as being the highest type of fireproof materials.

"With this building so adequately safeguarded, and sub-divided as it is, we feel that the property loss in such a risk would be a great deal smaller than it would be from any fire starting in a building not so carefully divided as this one, and certainly the lives of the occupants are safeguarded.

"Our general practice in building design is to build a consistent building—one that has no weak links. We do not build a wonderful fireproof floor and leave all or any of the openings unprotected, nor do we protect such openings with devices depending on springs and other flimsy contrivances to keep the fire out. It is our aim to construct a building so that a fire will find just as much opposition at all vertical openings as it would through the floor itself."



Plan of one of the upper floors in the new building, showing fire section and corridor layout. The arrows point the course of a firewall guarding one section of the floor, other similar walls dividing the fire area into four parts. Each section contains a fire tower and elevators and has access to two other sections through separate corridors in which automatic fire doors prevent the spread of flame and smoke from one section to another. Each of the four fire towers contains a 6-inch standpipe with a 100-foot hose connection at each floor. Elevator shafts, vent shafts, pipe shafts and fire towers are walled with brick and terra-cotta and are equipped with steel fire doors throughout. This design provides ample means of escape from, and approach to, the burning section.—[From Safety Engineering.]

Elevator Shaft Protection.

The elevator shafts are walled with brick and equipped with heavy wireglass in place of the usual open grill work, and all door openings are protected by automatic fire doors. About 295 of these doors are installed in the building for the protection of elevator shafts and corridors.

The doors are pocketed behind tile walls and operate by fusible links. They are made of two walls of cross-laid 22-gauge galvanized steel with air spaces and sheet asbestos between. Telescopic channels and joints provide for expansion and contraction along straight lines. The fire retardant qualities of these doors are not materially affected by the sudden change of temperature and the impact due to the application of a fire stream while under extreme heat. The doors are so constructed and set that the radiation of heat through the door and the amount of flame, heat and smoke passing around the edges of the door are reduced to a minimum.

In this manner the elevator shafts are made proof against fire and smoke and constitute the most efficient means of escape in time of danger.

The introduction of automatic fire doors is a new and exceedingly sensible departure in the construction of office buildings. In this manner only can vertical openings be well protected and long fire walls made absolutely fire resistive.

The freight lift shafts are equipped with counterbalance fire doors so arranged that they are continually closed except when the car is at the floor, thus presenting a steel barrier to fire which might enter the shaft and spread from floor to floor. These doors open up and down from the center, the two halves balancing and being operated by flexible chains running over ball-bearing pulleys. The upper edge of the bottom panel is reinforced by a heavy T-bar which extends beyond the panel at either side to rest on solid adjustable stops causing the upper surface of the lower panel to be held in rigid register with the building and car floors. The bridge thus formed presents a safe and solid trucking surface.

Floor arches, roof, furring and steel protection are of terra-cotta throughout; 52,000 tons of this material were called for in the fireproofing design; 34,000 tons of floor arches, varying from 12 to 16 inches in depth go to make up the 1,750,000 square feet of flooring. Other terra-cotta requirements are 300,000 feet of girder and wind-brace covering, 300,000 feet of column protection, 500,000 feet of furring and 1,250,000 feet of partitions.

Globe automatic sprinklers are installed in portions of the various floors as follows. In the sub-sub-basement: in the engineer's office, safe deposit vault and combination elevator corridor; in the sub-basement; in the freight room, waste paper storage room and elevator corridor; in the basement; in three kitchens, six workshops, janitors' storeroom and closet, and toilet room; on the first floor: two sprinkler heads over the top of the freight elevator shaft; throughout the entire third intermediate floor as shown in the accompanying plan, and on the thirty-sixth floor in the kitchen, pantry and service corridor.

The sprinkler system of the first floor basement, sub-basement and sub-sub-basement is supplied from two separate 4-inch street connections located on different streets, in strict accordance with the rules of the Water Department. A standard siamese steamer connection is installed on the sidewalk and connected with the sprinkler supply piping. All three of these sources of supply are equipped with check valves.

On the third intermediate floor the sprinkler system is supplied by two steel pressure tanks each having a capacity of 7,500 gallons and equipped with gauge-glass and shut-off valves, and also from the same fire pump and street steamer connections as the lower system. All three of these sources of supply are checked against each other. The tank filling and air lines are independent of each other and each line is equipped with both stop and check valves.

The system of the thirty-sixth floor is supplied from a 5,000-gallon vertical cylindrical, steel gravity tank with a removable steel cover, set on the thirty-eighth floor and so elevated that the bottom of the tank is 20 feet above the ceiling of the thirty-sixth floor.

A 2½-inch outlet is provided at the

thirty-eighth floor in the house tank supply line, and a 2-inch outlet at the third intermediate floor in the house tank supply line to the sixteenth floor. From these two openings run the filling lines to the sprinkler supply tanks. A 1½-inch outlet from the compressed air house supply line furnishes the necessary compressed air for the two pressure tanks which are installed on the third intermediate floor.

Running from the sub-sub-basement to the roof of the building, in a specially designed fireproof shaft, is the great stack, constructed of 5/16-inch steel and 596.6 feet long. This is the largest steel stack ever erected.

Chemical fire extinguishers will be installed throughout the building wherever necessary.

Complete Fire Alarm Service.

The fire alarm signal system is one of the most complete ever installed in a building of this class. The signal arrangements in general are somewhat similar to what is known as the A. D. T. system, with such extensions and modifications as are required to meet the conditions peculiar to this building. The following features will be included:

1. A fire alarm connection with the City Fire Department.
2. A fire alarm signal system local to the building.
3. A night watchman's supervision system reporting to a central office.
4. A special code signal system for calling employees, operated from Fire Chief's office.

Manual fire alarm boxes which connect with the Central Office of the National District Telegraph Company are installed in locations on each floor as required by the Underwriters. In the event of fire a glass panel in the manual box is broken and an alarm is transmitted to the Central Office by pulling down a hook, with the result that the city's fire apparatus responds to the location indicated by that box. The circuit arrangement is such that signals will be received at the Central Office, even though the lines connected with the Equitable building are open or grounded, this giving a double assurance of the transmission of the alarm.

On each floor are two electro-mechanical gongs, for use only in case of fire, for the purpose of notification. These gongs are operated from the same boxes used for the Central Office fire alarm, but over an entirely independent circuit, in a manner slightly different from that employed in general fire alarm service. The gongs are placed on 41 different circuits, each terminating on the switchboard in the Fire Chief's office, and are normally under constant test, which shows the line to be in operative condition.

There are also 192 tapper bells for the informing of employes in the event of fire, arranged on 24 circuits and located in the corridors of each floor. It was not deemed expedient to operate all the electro-mechanical gongs and disturb the entire building in the event of a fire, but it was necessary that all employes be promptly advised of such occurrence, consequently the use of tapper gongs was considered essential. In the event of fire, when any box is pulled, a local circuit which is separate and distinct from Central Office circuit is broken which connects with controlling relays in the Fire Chief's office. These relays automatically operate the 24 tapper circuits simultaneously, giving the alarm on all tapper bells throughout the building, as well as sounding an alarm and recording same in the Fire Chief's office. When deemed advisable, an alarm can also be transmitted over the electro-mechanical gongs on the different floors from the Fire Chief's office. The operator reading the signal as it comes in on the tape sets up the number he desires to transmit on a universal transmitter and at the same time throws the local gong circuit into ringing position. He will select such floors as are most likely to be affected by the fire and ring only these, the other gongs being idle and causing no alarm to tenants in the rest of the building.

It will be noted, there are two distinct sets of sounding apparatus throughout the building, and controlled by entirely separate circuits. The 24 tapper circuits are operated automatically by the manual fire alarm box when it is pulled. The 41 electro-mechanical gong circuits are always available for alarm purposes, but

are only used when conditions warrant. They are under the Chief Operator's control, and he simply throws the switches on such circuits as he desires to operate.

It should be understood that the alarm to the City fire department is being transmitted independently of this local alarm, and the fire department is being advised at the same time the building alarm is ringing.

Tabs on the Night Watchman

Inasmuch as it will be necessary to have night watchmen patroling the building nights, Sundays and holidays, a system of supervision has been employed utilizing the same box that is used for fire alarm service in the regular method employed by the A. D. T. system. Each watchman is provided with a key, makes his rounds on a definite schedule of time and is due to register his station at a certain time. This he does by inserting a special key in the fire alarm box and giving it a slight turn. The turning of this key sets the transmitting mechanism in motion and gives one round of the code number in the District company's Central Office, and the watchman is checked off by the operator, if he pulls the box on schedule time.

The specified route and time for each watchman should be followed by him in making his rounds, but he is allowed 15 minutes' grace. In case he does not pull the box within the 15 minutes' grace of the schedule, a "runner" from the Central Office is dispatched to ascertain the cause of his delinquency, and to get a written explanation. In event the watchman is ill, or otherwise disabled, another man is substituted to take his place so that the protection remains continuous.

A daily report covering the failures of the watchman is furnished each morning to some one designated in authority, and any irregularities are thus promptly remedied. The use of the box for transmitting watch signals practically guarantees the operation of the fire alarm service, as every time the watchman turns in his signal he is testing the box and the line to the Central Office.

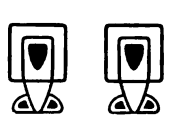
The 192 tapper bells mentioned above are also used for emergencies of any kind where it is desired to obtain the prompt response of the employes, and special code numbers can be sent out by the Chief Operator in the building over the circuit, which will indicate action desired by the night watchmen, porters, or others engaged in the building.

The use of this call system keeps the employes all within the reach of the Chief Operator.

The local alarms of all kinds are under the direct control of the operator in the Fire Chief's office. At this point are located the batteries and charging apparatus, relays, switches, and all other elements necessary for the operation of the system. The operator can tell at a glance whether everything is in normal condition, and by means of drops has visible notification of any trouble on any of the circuits. Inasmuch as he is in charge of the local fire brigade it is essential that he may thus communicate with his entire staff by means of the tapper arrangement provided.

A well-trained fire brigade will be maintained under the direction of a building chief. Fire drills will be held at stated intervals, in order to familiarize all tenants with the alarm system, and every precaution taken to insure a safe and speedy exit of all occupants of any section in which a fire might occur, without alarming tenants of other parts of the great building.

The four great fire towers which extend from top to bottom of the new building are enclosed by thick brick and terra cotta walls with fire doors of steel. Pipe shafts, vent shafts, and the shaft which encloses the great smoke-stack are also enclosed in similar walls.



Serving the Tenants *of the* New Equitable

What the Service Will Be and How It Will Be Given—Likewise Introducing a Modern Pooh-Bah, the Operating Manager

By D. W. Bowles.

There have been described in preceding articles the parts played by the Owner, the Architect, the General Contractor and the Rental Manager in the scheme of erecting and providing with tenants the largest office building in the world. All have done their allotted tasks. The forty stories tower, a huge, commanding, magnificent H, above all New York's skyscrapers, save for the towers of the Woolworth and Municipal buildings, also monuments to the building prowess of the Thompson-Starrett Company.

The building is filled with tenants. So far all the owner's calculations have balanced to a penny. He is on the road to profit. But the road to profit is a devious one and it has many inviting by-paths into which one may stray, leading to ultimate loss instead of profit. Who shall keep the owner on the straight road?

His Operating Manager.

The Operating Manager is the steering gear of this machine, which must run true, without skid or swerve, if it is to keep on the road to profit. The Renting Manager sells the space, the service. The Operating Manager must see to it the service paid for is received. Otherwise tenants fail to renew leases and the Path of Profit become the Road to Ruin.

Just as the Rental Manager sat in the conference to have his say regarding changes in the plans which would affect him in the selling of space, so the Operating Manager sat in them to speak his mind on changes which would hinder him in giving what the owner demanded, the best service of any office building in the world. He represented not only the service, he represented the man who must prevent leaks, who must keep overhead down, efficiency high and maintenance low. This man was Clarence T. Coley.

It possibly is news to many who will read this that six years ago, before fire destroyed the Old Equitable Building, D. H. Burnham & Co. of Chicago (the old name of the firm of which E. R. Graham is now one of the heads) made estimates for Paul Morton, as President of the Equitable Life Assurance Society, on a sixty-story building for the Equitable site. At that same time Mr. Coley figured on the operating costs of such a structure and the calculations he made then he has now used in computating the costs of the operation of the standing Equitable building.

A Mayor in All But Name

Now the Equitable Building is going to be a city with a floating and resident population of 50,000 persons every day. Mr. Coley is going to be the Mayor of that city; likewise its Police Commissioner, its Fire Commissioner, its building Superintendent, its Commissioner of Water, Gas and Electricity, its Fire Prevention Bureau, its Building Inspection Bureau and a member of its Board of Estimate. He will be a real Pooh-Bah, and with good reason, since the building has its streets, its gas, water and electric mains, its fire alarm system, its shops, its street cleaners, its traffic squad, its transportation lines, its supply—in brief, practically the same kind of machinery of man and metal that is to be found in New York's administrative plant. In many respects the transportation system of the Equitable building is far superior to that of any of New York City's lines. For example, if one tenant boards a car for the eighth floor and another a car for the thirty-sixth floor in the Equitable building, both will arrive at their floor at the same moment. That's one angle of the elevator schedule. The purpose is to put

top floor tenants into their offices as quickly as lower floor tenants can get to theirs. This is done by sixteen low rise and twelve high rise elevators.

The Administrative Center

The office of the Operating Manager, the administrative center, is on the ground floor near the elevator bank serving all floors and also the freight elevators. It is directly in the path of tenants entering or leaving the building. If a tenant should have a complaint to make or be seeking information, he can stop in the Manager's office without loss of time. To save time for the tenants in this respect, each will be furnished with a card on which will appear, so far as the Operating Manager can judge from his experience, headings under which a tenant would make complaints or seek information. The tenant has only to fill out this card to suit his particular need and leave it in the Manager's office.

From his office the Operating Manager, of course, has telephone connection with all the operating departments of the building, from the pent house on the roof to the sub-sub-basement. A telephone on each floor connected directly with his office allows either tenants or the building employes on that floor to get into instant communication with the Manager's office. Mr. Coley really has under his charge four separate buildings, for the structure is divided into four quarter sections, each complete in itself and separated from the others by fire walls and fire doors, yet inter-communicating. Each section, zone or unit has its own telephone, lighting and fire alarm system and janitor service, so that difficulty of any nature in one zone will not affect the service of the others. On each floor there is a fire alarm signal which tells the building employes and the tenants of the zone in which the floor is situated, the location in the building of any fire that may occur in it.

On the fourth floor are grouped the lockers for porters, elevator operators and cleaners and the storerooms containing the supplies for all the operating departments. From this service center each employe goes to the zone of his labors. This floor is fully equipped with Globe automatic sprinklers and fire doors separate it from the adjoining floors in the same zone.

Saving the Tenants' Time

Time is money, even though under present conditions most of us have more of the former than of the latter. Nevertheless, even now, all of us want to get to our destination in the quickest possible time. We don't want to waste time hunting for the location of the man we wish to see; when we find where he is located, we don't want to spend time in finding out how to get there. To give the caller on the tenant as he enters the building the directions which will enable him to get to his man in the shortest time, no less than to give both him and the tenant the speediest transportation, have been one of the chief problems of the Operating Department. The answer to this problem is found in the arrangement of three chief factors, signs on the ground and all floors, the arrangement of elevator pockets and the timing of the elevator service.

There is no Directory Board on the ground floor. This prevents the utilization of such a directory by canvassers or the agents of those seeking names and addresses for the purpose of advertising or circularization. The Information Desk gives the inquirer the information he desires more quickly than would a directory. On each floor there is a public telephone connected with the information desk. As one enters the building, no matter from which of the four sides, he will be confronted by illuminated signs in the elevator lobby, telling him to go in one of two directions. To reach all floors from Nos. 1 to 31, he is told to follow the arrow pointing to the north; to reach all floors from 32 to 62 he is told to follow the arrow pointing to the south. Thus he goes directly to the elevator banks, each of which shows the floors at which its cars stop.

When the passenger leaves the elevator at his floor he finds the direction system he saw in the lobby repeated. The elevator corridors run north and south, intersecting the main corridors running east and west on which the offices are located. At the ends of each elevator corridor are illuminated signs showing the lowest and highest numbered offices in

the office corridors. The visitor has only to turn to the right or left and walk to his destination. There is no crystal maze or labyrinth of corridors.

The Elevator Corridors.

The elevator corridors are really pockets. These are so placed that the elevator traffic is shut off, both in the main lobby and on each floor from the traffic of the corridors in which the offices are situated. In other words there is no interference with through traffic, and this applies to the main floor and each and every floor.

There is not an office building in the world in which this feature appears except in the new Equitable. There is not an office building in New York City, with whose office buildings no city can compare, in which the elevator traffic does not have its start and end in an open corridor fronting on offices, with resultant congestion depending on the population of the building.

One of the most difficult features with which building managers have to deal in the operation of elevator traffic is the timing of the cars—the moment at which they shall leave the top and bottom of the shaft. In most buildings regularity of schedule depends on the starter on the main floor. In the new Equitable Building, a signalling device which sounds at the top and bottom of each shaft and fixes the interval between up and down trips insures the maintenance of a proper schedule. The Chief Starter being able to regulate this signal according to the needs of the traffic. A school will be maintained for the training of operators.

Space in elevator shafting has been conserved by eliminating unnecessary gates and openings. For each shaft the first gate opening represents the first stop. There are no gates where there is not a stop. This represents not only a saving in operating cost, but in initial construction cost. Each elevator is fitted with side doors so that passengers can pass from one car to another in the shaft should this become necessary.

The usual practice is to place all wires —telephone, telegraph and electric light in separate ducts in one conduit. In case of accident or fire in any one duct the others are put in jeopardy. Since the telephone system is the chief means of intercommunication within the building as well as one of the chief arteries for the transaction of the business of its tenants, the telephone system is here separated from all other wire service.

In place of the regulation number of janitors' slop sinks and closets to a floor, two, there are five to a floor in the New Equitable, Mr. Coley having found that there is economy in time and labor in this number. The water and towel service for the tenants will be in the hands of the management of the building, its uniformed employes distributing both. This means that bottles of water and towels will not be carried on the elevators and that in case of need of an increased supply of either, the tenant has only to call the manager's office on the telephone to satisfy his needs. The distribution of this service will be carried on before the tenants reach their offices and they will be saved the annoyance of having two different sets of men entering their offices.

Sixty-two Offices to a Floor.

There are sixty-two offices to the floor in the building. The maximum depth of each office is twenty-three feet. The amount of natural light which will enter an office depends on its depth, and this depth of twenty-three feet was chosen as giving the greatest amount of light, commensurate with the needs of the kind of tenant likely to be attracted to the building and the same time represent for the owner a minimum cost in operation. The space is divided to suit the needs of the tenant, in accordance with his wishes or as laid out, after his acceptance, by the Efficiency Department, by portable subdividing partitions. The use of these partitions, stained to match the office or furniture or erected to any height desired by the tenant, saves the owner the cost of tearing down and rebuilding walls and saves the tenant the noise, delay and dirt attendant upon the tearing down of built up work.

It is in this constant care for economy that the Operating Department of the New Equitable Building has probably reached the highest point of efficiency, for both owner and tenant, combined with the lowest of operation. For ex-

ample, the elevator pits are so constructed that all shaft work is done out of sight of the tenant. At the same time it is so done that the surrounding stone work does not become soiled, thereby avoiding unsightly appearance and the cost of extra cleaning. Mr. Coley is not going to be caught with a shortage of coal during a cold snap. The bunker capacity of the New Equitable will be forty-five days' supply in advance and it will use on the average in the winter season fifty tons a day.

In the delivery of the coal itself, aside from the fact that the supply will be bought by barge load at the season when the rate is the lowest, a saving is represented. The coal truck will back up to the sidewalk, hoist the wagon body and dump the coal into a chute which is so arranged that each of the bunker compartments receives its capacity share. There will be no need of shovelling. Once the coal is in the bunker it runs automatically into the firing car and the firing car runs on rails to the furnace doors. Again a maximum of result with a minimum of labor effort.

The removal of ashes represents another advance in labor and time saving for the owner and rids the tenants as well as all those who use the streets surrounding the building of a discomfort all too frequent in New York. The ashes are automatically loaded into cars, run to an elevator, lifted to a height above the street level and dumped into the cart awaiting them.

Still another cost and labor saving device is represented by the Winslow windows which give ventilation without creating a draught and at the same time act as awnings. These windows save the purchase of 5,000 awnings to say nothing of the labor and time involved in erecting and taking down awnings and the inconvenience to tenants.

The tenant of the New Equitable may note that a bronze strip runs around the bottom of all base boards. He may think it is for ornament. It isn't. It is for economy in operation, to save the owner's money in labor and wear and tear. When a floor is washed the water and cleaning compound used naturally hit the bottom of the baseboard. This means wearing away of paint and varnish and unsightly appearance. The bronze strips will not be affected by the cleaning process and can always be kept sightly.

Marble drinking fountains, supplying filtered water are placed on each floor. The lighting system is of the semi-indirect type with translucent fixtures. Steam furnishes th heat from boilers generating 3,200 horsepower. On each floor there is rentable storage space for tenants in fireproof rooms, separated from the corridors by fireproof walls and fireproof doors.

Bankers' Club a Tenant.

The thirty-sixth floor is to be occupied by the Bankers' Club of America. On the thirty-seventh and thirty-eighth floors will be a women's restaurant and rest rooms, giving access to the roof. The first sub-basement will contain safety vaults and part of the mechanical equipment and the sub-sub-basement will be given over to operating machinery.

Five thousand National radiators will heat the offices, being placed at every exposure. These radiators are equipped with a packless valve which means that the owner is saved the cost and labor of constant overhauling. Each radiator is separately controlled so that an even temperature may be maintained.

There will be twelve revolving doors in the Equitable Building, 7′ 0″, a size that will permit the passage of the largest number of people in a given period of time. The doors are installed as follows: three in the Broadway entrance, three in the Nassau Street entrance, two in the Pine Street entrance, two in the Cedar Street entrance, and two in the Broadway subway entrance.

The total resident population of the building is estimated at eighty-three hundred, about sixty per cent. of this number of five thousand, will use the Broadway entrance which calls for three revolving doors. About thirty per cent. or fifteen hundred are expected to enter the building within fifteen or twenty minutes in the morning, which would make a total of five hundred people for each entrance to take care of during that period. This would mean that thirty-four people would pass in through one of the

revolving doors every minute. A seven foot revolving door under extreme rush conditions can easily take care of sixty people a minute while in its revolving position.

It is estimated that the elevators will land 94 people on the ground floor every thirty seconds or 188 people every minute. Assuming that sixty per cent. of these people use the Broadway entrance, which will make a total of 112 or 113 people, the three revolving doors on the Broadway entrance will accommodate this number going out as well as an equal number coming in.

A seven foot revolving door will under ordinary conditions take care of from 2,500 to 3,000 people every hour without any difficulty.

The water supply for the building comes from mains in Broadway and Cedar, Nassau and Pine Streets, being run in with cast iron to the water meters which are provided with a gate valve on each side. From the meters connection is made to the surge tanks which are two in number, each of 5,000 gallons capacity, one being used for building service and one for fire pump service.

Five filters are used, each having a capacity to filter 10,000 gallons of water an hour. The filters are placed on a concrete foundation which raises them four inches above the floor. Piping connections between and around them are so arranged that they can be used singly or together or entirely bypassed.

The refrigerating plant has a capacity of 20 tons of clear ice a day, besides maintaining the air in the refrigerators at a proper low temperature. The plant is of the absorption type, refrigeration being effected by indirect expansion of ammonia and chloride of calcium brine is circulated through coils by means of steam-driven circulating pumps.

The Bricks Furnished.

The New Jersey Company furnished 14,500,000 bricks, known as the Taylor Repressed Brick. The capacity of their factory at Mattewan, N. J., is 100,000,000 a year. The largest order of bricks that was ever contracted for one building was secured through this company. Taylor brick has a greater resistance than any brick known. It is manufactured by the New Jersey Company, 17 Battery Place, New York City. It is acknowledged to be the premier building brick. It has the richest uniform color and finest texture, which ranks among the best for face work.

Temporary Reverse.

Fogarty (a moderate drinker): "I'll bet ye th' Rooshians are beginnin' t' feel th' loss iv vodka.

Flaherty (warmly): Don't ye lose any slape over it. Mar-rk me wur-rds, they'll retake it agin before long!—Puck.

Electricity in the Construction of the Equitable Building.

By G. L. REDMAN.

The New York Edison Company played no small part in the erection of the Equitable Building. Electricity is supplanting steam in excavation and building work in New York City. Even before the ruins of the old Equitable Building had been cleared away, the power bureau of the Edison Company had negotiated a contract with the O'Rourke Engineering and Construction Company, the excavators, to supply them with current for an electrical equipment of about 1,500 horsepower.

To begin with, there were two large compressors, one of 140 horsepower and the other 160 horsepower. These were used to compress the air in building the caissons. Twelve heavy motors used for hoisting were placed on travelers, which were arranged so that they could completely surround the excavation. Two other motors, operating hoists, were also located in the hole. These were used to hoist the 50,000 cubic yards of material that was taken out in making the caissons. In all, there were one hundred and seventeen of these caissons built, thirty-seven in the wall and eighty in the interior. All these caissons were sunk 80 feet below the curb line, and it is interesting to note the different kinds of material excavated as they went down. At 35 feet, sand was found; at 50 feet, clay; at 68 feet, hard pan, and finally bed rock at 80 feet. To build the caissons two large concrete mixers turned out 17,000 cubic yards of concrete.

The O'Rourke Engineering and Construction Company in making this huge excavation and building the foundations for this structure consumed 880,522 kilowatt hours. The job was then turned over to the Thompson-Starrett Company, who completed this great work.

The Thompson-Starrett Company called for about the same power load —that is to say, 1,500 horsepower—but an increase of about six hundred lights and ten arc lamps on the lighting circuit. This power load was split principally into hoisting engines used for hod hoists, several compressors, derricks, stone hoists, etc.

Their consumption in completing the mammoth structure amounted to 401,384 kilowatt hours. Thus the entire consumption of electrical energy used in the construction of this modern office building totaled over one and one-fifth million kilowatt hours.

The Work of the H. W. Johns-Manville Company in the New Equitable Building.

In the new Equitable Building consideration has been given in a high degree to the insulation of heated surfaces for the purpose of the most economical operation of the power and heating plant, and also for the purpose of rendering conditions as affecting the tenancy of the building throughout ideal.

On the high pressure steam lines and exhaust lines throughout the building, 1½-inch thick J-M 85 per cent magnesia coverings are applied. Fittings and flanges in connection with this work are covered in a similar manner and are made removable for ease of access to bolts, etc., in the case of necessary repairs or adjustments. This work is finally finished with an extra canvas jacket sewed on and painted.

Tanks, heaters, separators, etc., are insulated with 1½-inch thick J-M 85 per cent magnesia blocks over a 1-inch air space, then finished with ½-inch thick asbestos cement with an additional canvas jacket sewed and painted. Vapor lines, safety valve blow-off lines, blow-off lines from boilers, high and low pressure drips in boiler, engine and pump rooms, and also low pressure return lines in sub-sub-basement are covered in a similar manner, except with J-M standard thick sectional covering. Boiler feed lines in sub-sub-basement are covered with J-M special double layer wool felt coverings.

All heating lines above the sub-sub-basement, except risers and radiator branches, are covered with 1-inch thick J-M asbestos moulded covering. Heating risers, radiator branches and expansion loops are covered with ¾-inch thick J-M special wool felt covering. All fresh air ducts are covered with J-M special air cell sheets, finished with a heavy sewed canvas jacket, this work approximating 36,000 square feet.

Steam cylinders and steam chests of pumps are covered with removable jackets built up of J-M 85 per cent magnesia blocks, with cement finish. Boiler drumheads are covered with 2-inch thick J-M 85 per cent magnesia blocks and finished with ½-inch thickness of cement, troweled hard and smooth. Of this work there are twenty-eight boiler heads, each 42-inch diameter.

The entire ceilings of the boiler and pump rooms are insulated with a suspended ceiling, in which we have erected our 2-inch thick special J-M vitribestos sheets, these being erected in special angle iron construction and finally finished with plaster. The object of this special ceiling is to prevent the passage of excess heat to the floors above the boiler and pump rooms.

The smokestack is lined with our special J-M vitribestos sheets, 2-inch thickness, the lining being carried from the base to the top of the stack, which is 11 feet inside diameter and about 555 feet high. The object of this lining is especially to preserve the metal of the stack from deterioration, due to the rapid passage of the gases of combustion. The smoke breeching is lined in the same manner and for the same purpose.

Fire Standpipes in Equitable Building.

The fire standpipes installed in the new Equitable Building by J. N. Knight & Son under the supervision of Edward F. Croker, ex-fire chief of New York City, are all equipped with the Ford Fire Line Reducing Valve to insure a supplying of a nominal pressure on the hose fixtures on each floor.

The house service and fire pumps are all equipped with the Ford Pump Regulating Valve, and all surge, roof and intermediate tank water levels are controlled by the Ford Balanced Tank Float Valve.

The chief use of Fire Line Reducing Valves in standpipes of buildings of considerable height is to reduce down the high pressure from roof tank, as a measure of physical safety to the occupants, insurance for the owner against liability; in fact, for the very efficiency of the fire line itself, as a fire prevention factor.

As long as five years ago, it became recognized that pressures on the lower floors of high buildings (twelve floors or more) were so excessive that to expect the average tenant to handle them was both unreasonable and dangerous, and that at given points in the standpipe the pressure should be reduced by the installation of reducing pressure valves.

The manipulation of a sizable hose and nozzle with more pressure than fifty pounds requires both considerable strength and considerable experience to prevent its getting away from the operator and doing damage by "snaking." How many men among the average occupants of buildings have ever had experience with anything more formidable than a garden hose? Yet the hose is on each floor for their use, and they will naturally employ it during the first emergency period of a fire.

It stands out, therefore, as a plain duty to install apparatus that will supply them with a pressure that will be adequate, twenty-five to fifty pounds for incipient fires, something that they can use, instead of an arrangement carrying a pressure excessive to a point of danger.

The Steam Circulation System.

The circulation of steam to the 5,000 direct radiators, the vento stacks forming a part of the ventilating system and the eight large hot water heaters from which house service is supplied, is effected by means of the Webster vacuum system of steam heating.

The apparatus is so constructed as to utilize exhaust steam from engines, pumps, etc., with provision for supplementing the exhaust with live steam under reduced pressure where the exhaust is not sufficient.

This system, recognized by the experts in the heating profession as comprising the best known apparatus and organization for the purpose, was given the preference by the owners, who in this as in all other details of equipment sought the best for the purpose through a careful investigation by their engineers.

The special apparatus forming the Webster system was furnished by Warren Webster & Co., whose main office and factory are located at Camden, N. J., and whose principal branch office is at 71 Murray street, New York.

Each of the direct radiators has on its drip connection a Webster sylphon trap.

Each of the drip points of supply mains and risers—about one hundred in all and each of the Vento radiation sections of the ventilating system, about ninety in all, has a Webster sylphon trap.

The hot water generators which are larger condensation units have their drip connections controlled by Webster Thermostatic Traps. In these traps the large volume of hot water is controlled by a valve operated by a float and the relatively small volume of air is controlled by a thermostatic member actuated by difference in latent heat of steam and air.

A partial vacuum is maintained in the return lines from all radiation beyond the Webster traps by means of three vacuum pumps so cross connected that either of them may be employed to handle the condensation and air from the total radiation, or that any one of them may be employed on the direct radiation while another is employed on the indirect radiation and hot water heaters, and that the third pump be in reserve for either or both duties.

All three of these pumps are fitted on their steam supplied with Webster vacuum governors, by means of which the speed of the pumps may be automatically controlled to maintain any desired degree of partial vacuum in the return line upon which the pump is operating.

To prevent the scoring of the linings of these pumps by core sand and scale from interior of radiation, Webster suction strainers are installed on the main return pipes from the heating system before same enter the headers from which condensation is distributed to the pumps. On the large drip points where scale and dirt is liable to accumulate, another form of strainers called Webster dirt pots are installed ahead of the Webster trap.

These dirt pots provide a convenient means of collection and removal of the accumulation which otherwise might lodge in the traps.

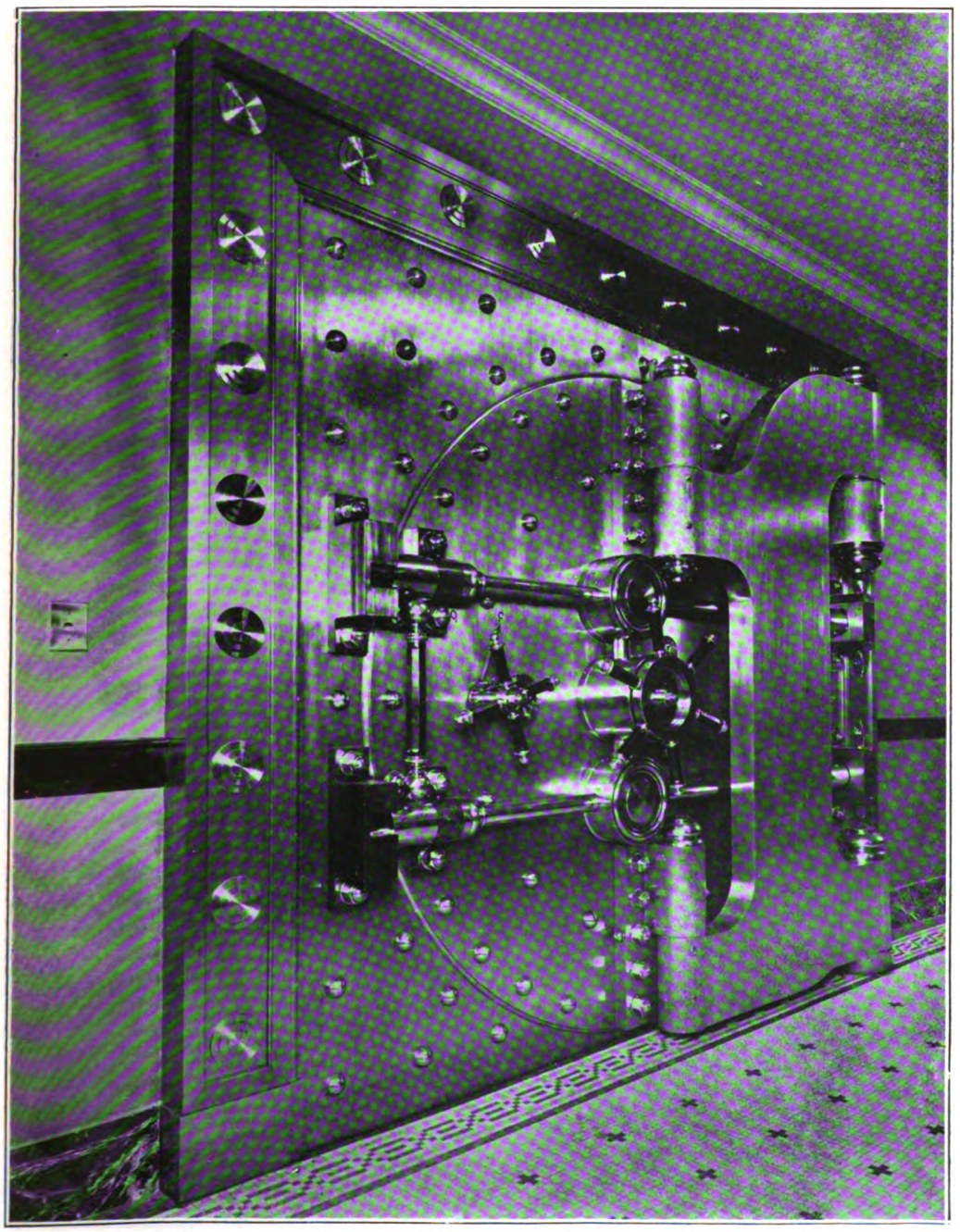
Largest Safe Vault in the World.

The largest safe deposit vault in the world has been constructed by the York Safe and Lock Company, of York, Pa., and 55 Maiden Lane, New York, for the new Equitable. It will have a round door of greater diameter and greater thickness than any entrance of this type ever made. This door is constructed of a combination of special steels that provide against every known method of attack.

The locking mechanism consists of twenty-four large steel bolts, distributed around the circumference of the door. These locking bolts are controlled by double burglar-proof combination locks and a quadruple or four-movement time lock. At the front of the main entrance there is a lowering platform, so arranged that a section of the banking room floor can be lowered while the door is being opened or closed, and then raised into position so that it forms a level walk from the banking room outside to the interior of the vault, without any obstruction from the door frame.

In addition to the main entrance there is also an emergency entrance of the same thickness and construction as the main door, but having an opening that is smaller in diameter. This door is provided as a safeguard so that access may be had to the vault in the event anything should occur to cause a lockout, or prevent the opening of the main door.

The inside of the vault is filled with individual safe deposit boxes of the most modern type that afford every convenience and protection. Each box is secured by either a combination lock or a special key-lock that requires the use of two keys to open any box. One of these keys is termed the guard key, which is held by the custodian of the vault. This key must be used in every lock before the box renter's key will open, but both keys must be used to complete the unlocking. This insures absolute privacy for the contents of each box and at the same time makes it impossible for any box to be opened without the knowledge of the vault custodian.



Door of Safe Deposit Vault, Equitable Bldg.
Manufactured by York Safe & Lock Co.

THE MODERN BUILDING ORGANIZATION

(*Continued from page 28.*)

ance without prejudice to an owner's right to take competitive figures or enlist advice from other sources.

The Promotion Department is merely the channel through which a modern building organization co-operates with its prospective clients. This service, of course, includes the preparation of approximate estimates, thereafter to be followed by a final figure, or estimate, at which the general contractor will be willing to take the work. This phase of promotion brings us to the Estimating Department of the modern building organization, upon which devolves a large part of the credit for most of the business secured. More often than not *figures* are the determining factor in securing a building award, so that the Estimating Department of an organization may be regarded as one of the most important factors in procuring business.

Estimating Department

The Estimating Department upon receiving a request for a bid on a building, whether through the Promotion Department or direct from the owner or his architect, procures from the latter a set of specifications and plans upon which to base its estimate. An examination of these specifications and plans is made, and the work comprehended therein divided into two classes—*the work which the organization itself will handle direct and the work which it will sublet.* In estimating the cost of the work under the first classification the Estimating Department will, where necessary, procure such additional data from other departments in the organization as may be necessary to the intelligent and accurate preparation of its figures. The work under the second classification will be handled in the following manner: The full list of responsible sub-contractors on every branch of work will be invited to submit bids, and upon their acceptance of this invitation, their estimate men may have access to the plans and specifications which are at their disposal in a room specially provided for that purpose. A date will be set for the receipt of these bids, when they will be opened and tabulated in the order of their priority from the viewpoint of price. Thereafter the lowest figure for each line of work (always provided that this figure is neither appreciably less nor more than the approximate value of the work, as determined by the Estimating Department of the organization) will be accepted and included in the total estimate for the work. To this total estimate will be added a fair and legitimate profit (the amount of such profit very often being a stipulated percentage of the cost of the whole), and this figure submitted either to the owner or the architect, as may be necessary.

Very often, before the Estimating Department submits a final figure, it will suggest economies or modifications having for their purpose the reduction of the total cost to the owner. The volume of work handled by this department, and the fact that it is at all times in constant touch with the material and the manufacturing markets, enables it to so familiarize itself with the prices of labor and material that it is in the best possible position to ensure an economical cost.

The first step after a contract for a building is procured also devolves upon the Estimating Department, which immediately proceeds to prepare a Time Schedule. This Time Schedule may be regarded as the plan of campaign. It is a chronological reference sheet only. It deals only with dates. It lists every line of work and distributes to each the time available for its completion in relation to the completion period for the whole structure. Opposite each item of work are four dates:

The date on or before which each contract must be let.

This date will govern the Contract Department in the letting of contracts.

The date on or before which approved details therefor must be received from the architect.

This date will govern the Draughting Department in the matter of obtaining details from the architect for the various lines of work, as well as in the obtaining of shop drawings to be submitted to the architect for approval.

The specific date when the work of actual construction shall commence on each line of work.

The Contract Department will incorporate this date in all sub-contracts, and the Construction Department will be governed by this date in its work of having each of the various lines commence on schedule time.

The date when each line of work *must* finish.

The Contract Department will incorporate this date in all sub-contracts, and the Construction Department will be governed by this date in its work of having the various lines finish on schedule time.

It is only by strict adherence to these dates that the finished structure can be turned over to the owner upon the completion date incorporated in the contract. And only a building organization equipped and systematized to bring every line of work in alignment at the proper time can hope to adhere to such a schedule itself and assume the responsibility of enforcing adherence from its sub-contractors.

The Estimating Department will also prepare a Working Estimate dividing the work and the cost thereof into its numerous classifications, itemizing in detail the work thereunder and distributing the the cost of *Material* and *Labor* in proper ratio. Thus the Working Estimate is, in effect, the original accepted estimate for the operation reduced to fractions. This Working Estimate will be in constant use by practically all departments, for the work of no one department is so thoroughly divorced from the element of cost that it can afford to disregard the Working Estimate as a source of reference. It constitutes, in fact, an invaluable guide for all departments in their efforts to obviate the tendency of actual cost to exceed the Estimate.

(*This article will be completed in the March issue.*)

The Mail Chute Equipment.

The mail chute equipment of the Equitable Building is designed to be the most complete and efficient yet installed. It will consist of eight Cutler mail chutes arranged in pairs, with four special U. S. mail boxes of bronze from the architect's special design, one located at each corner of the building, with two mail chutes delivering into each.

The mail chutes will be of the model C type, with their entire fronts in the form of doors hinged at one side and secured at the other by means of special locking mechanism. This type of mail chute is designed for what the elevator people call "high duty." It is obvious, in the case of a possible blockade, a mail chute thirty-seven stories high would fill up quickly, and in order to prevent delaying the mail it must be so designed and constructed that it

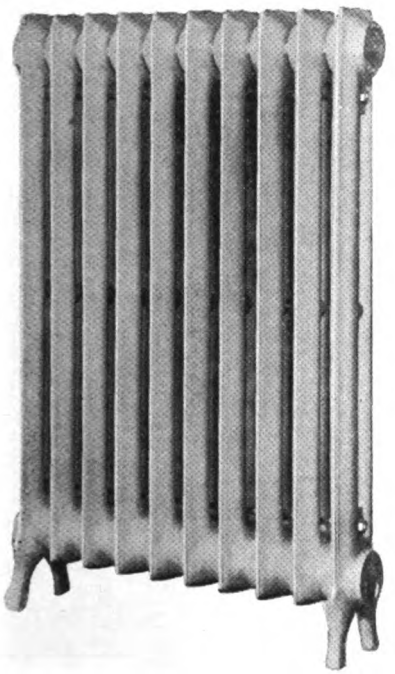
can be opened, cleared and closed again by the postoffice men to whom this duty is assigned, in the least possible time and with the least possible work. To accomplish this and to prevent as far as possible such mishaps as leaving the chute unlocked, or locking it before it is properly closed, or perhaps having some passerby walk away with the key, the chutes are so arranged that the key, once turned to unlock it, cannot be withdrawn until it is properly locked, and the chute once opened cannot be locked until it is again properly closed. This interlocking arrangement has proved to be of great importance and value in such great structures where the mail is heavy, and in case of a blockade every minute counts.

This equipment is the best that can be provided, and as proof of this it is only necessary to add that it is the highest development of the Cutler Mailing System, as made and installed by the well-known Cutler Mail Chute Company, Rochester, N. Y.

Heating and Ventilation.

In the erection of the Equitable Building, the "Goliath" of modern building construction, there was no part of the work that required greater care than the engineering department in charge of the heating and ventilating system.

The plans and specifications covering the heating plant for a building like the Equitable are as little like the plans for work of a similar nature in the large office buildings of twenty-five or thirty years ago as the plans of the superdreadnaught compared with such war crafts as the Monitor and Merrimac of fifty years ago. From the power plant, located in the very bowels of the earth, to the topmost floor, everything from the huge boilers to the smallest valve has been subjected to the most careful tests and



Style of Radiator in Equitable Building

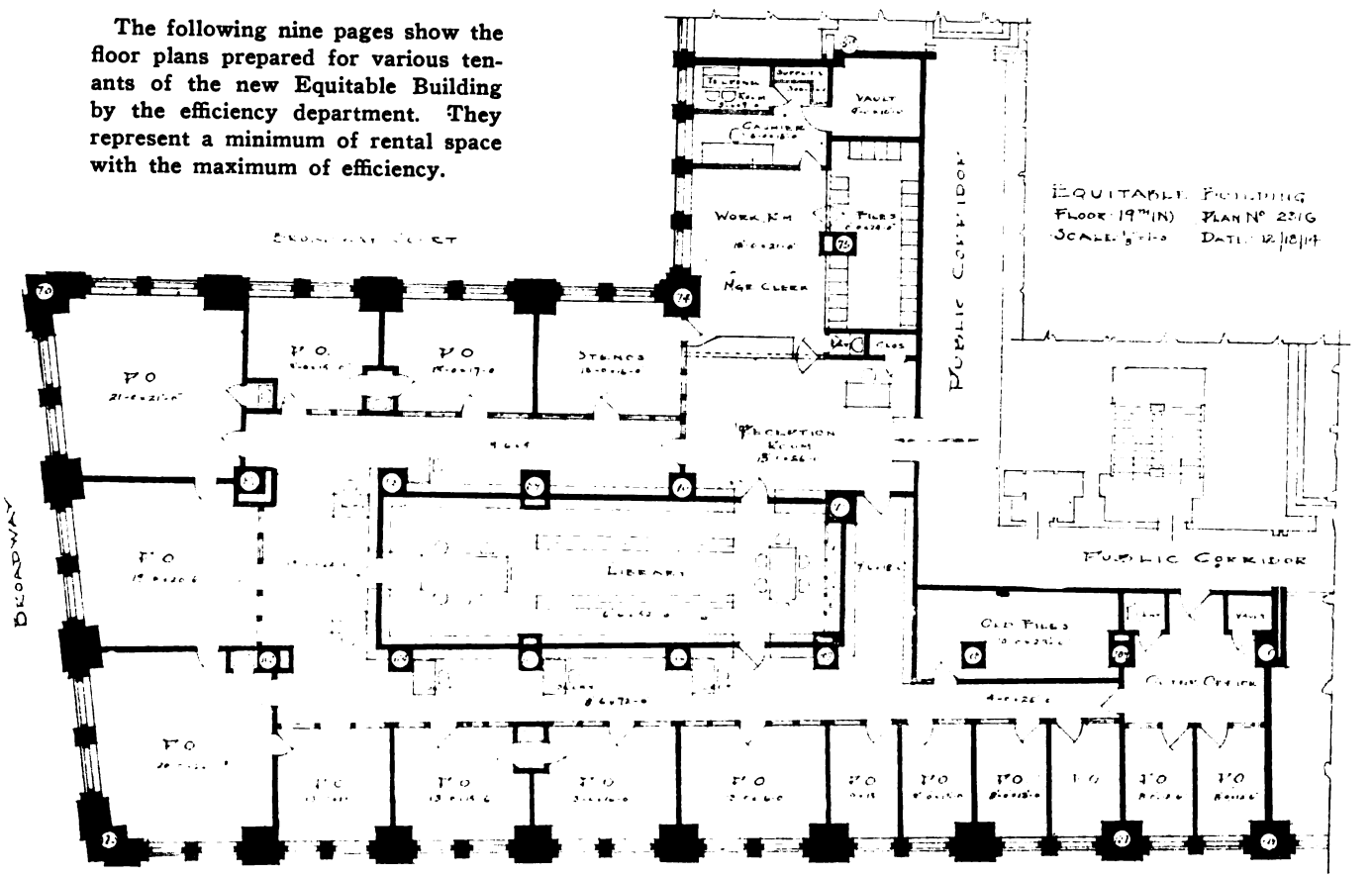
analyses by the corps of engineers in charge of this part of the work.

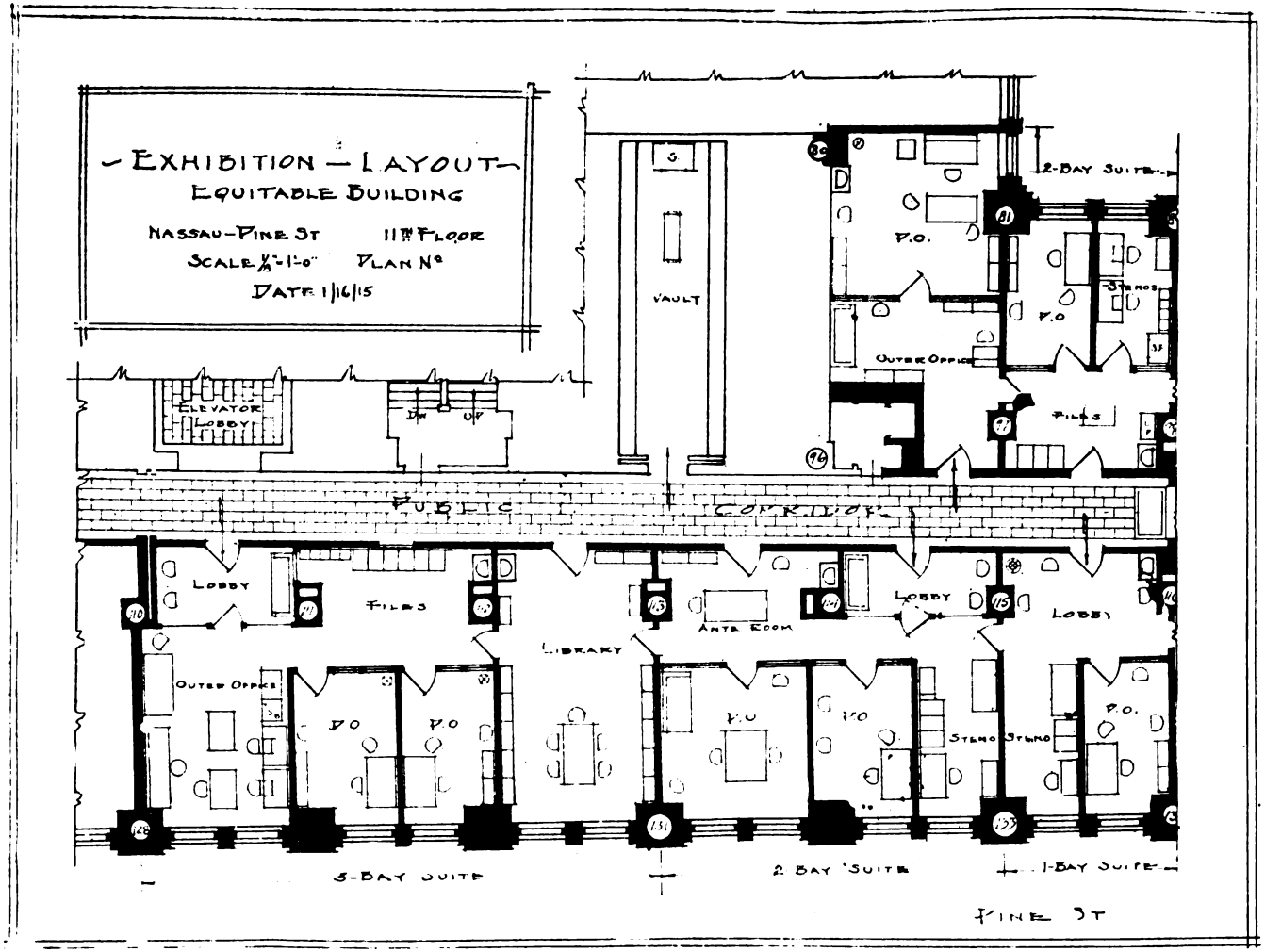
It was, therefore, with unusual satisfaction that the National Radiator Company learned early last year that after their radiators had been subjected to these unusual tests and inspections along with the makes of a number of other leading manufacturers, their product had been selected for the heating system. The design of radiators selected is in keeping with the character of the building. The ratings are conservative and the clean, smooth castings show workmanship of an exceptional order.

One of the very strong features of the National Radiator Company's product is their heavy cast iron push nipple, slightly annealed, making an iron to iron joint, and a joint that is absolutely tight without the use of packing of any kind. This method of making boiler and radiator joints is conceded to be the most practical and permanent known to the engineering profession.

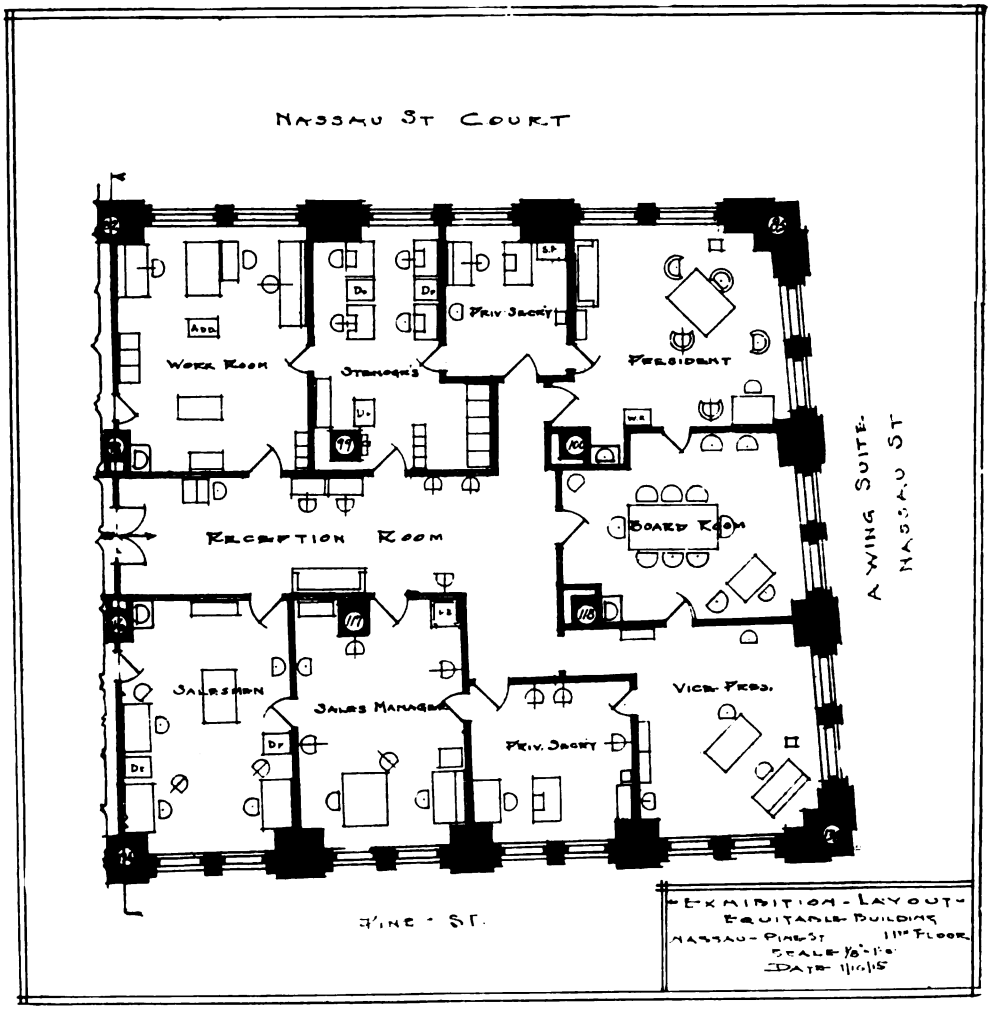
The National Radiator Company has large plants for the manufacture of their product at Johnstown, Pa., and Trenton, N. J. The radiators for the Equitable Building were made and shipped from their Trenton plant, and had it been possible to handle the radiation at the building in one shipment, it would have made a train-load of forty cars.

The following nine pages show the floor plans prepared for various tenants of the new Equitable Building by the efficiency department. They represent a minimum of rental space with the maximum of efficiency.

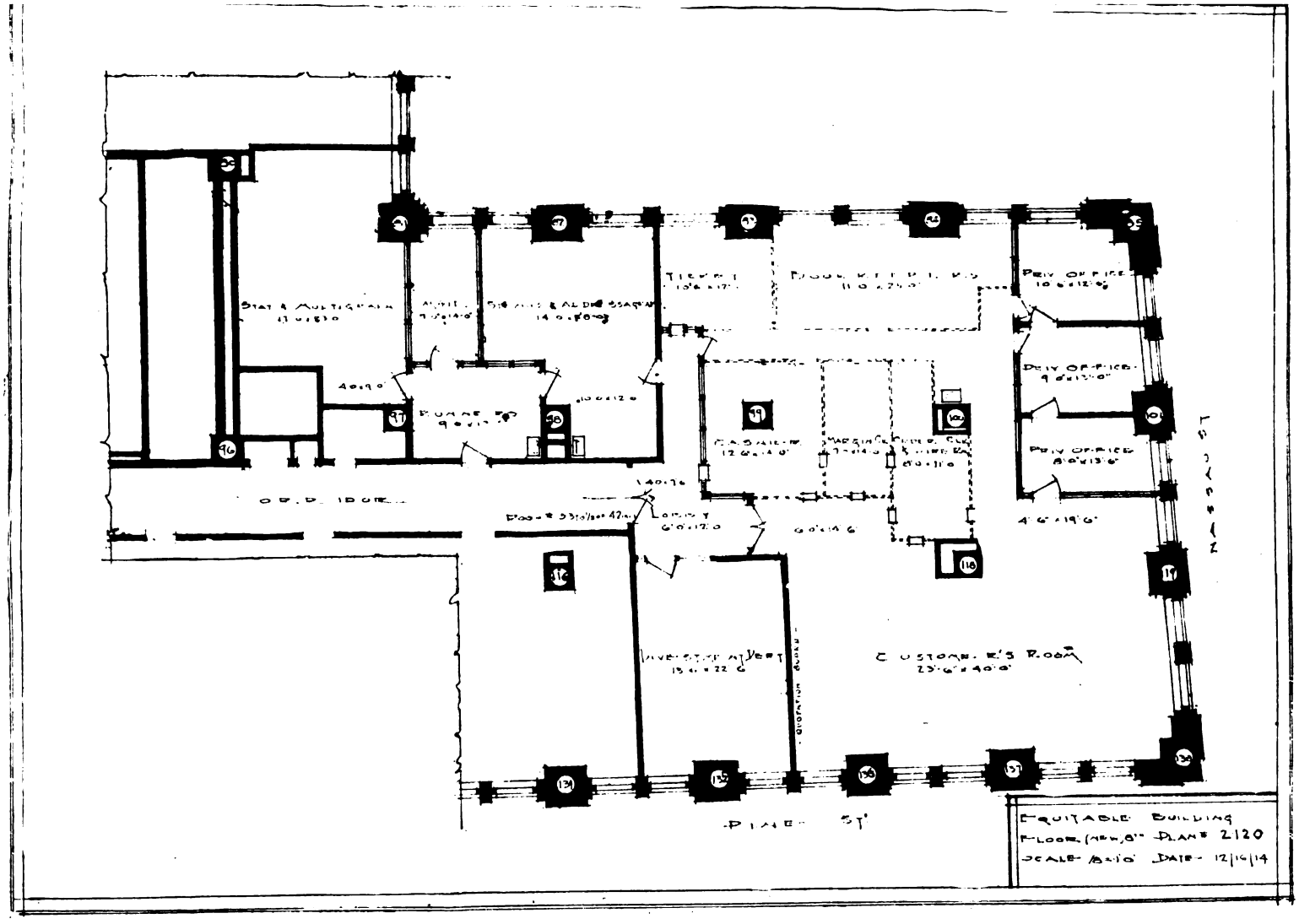




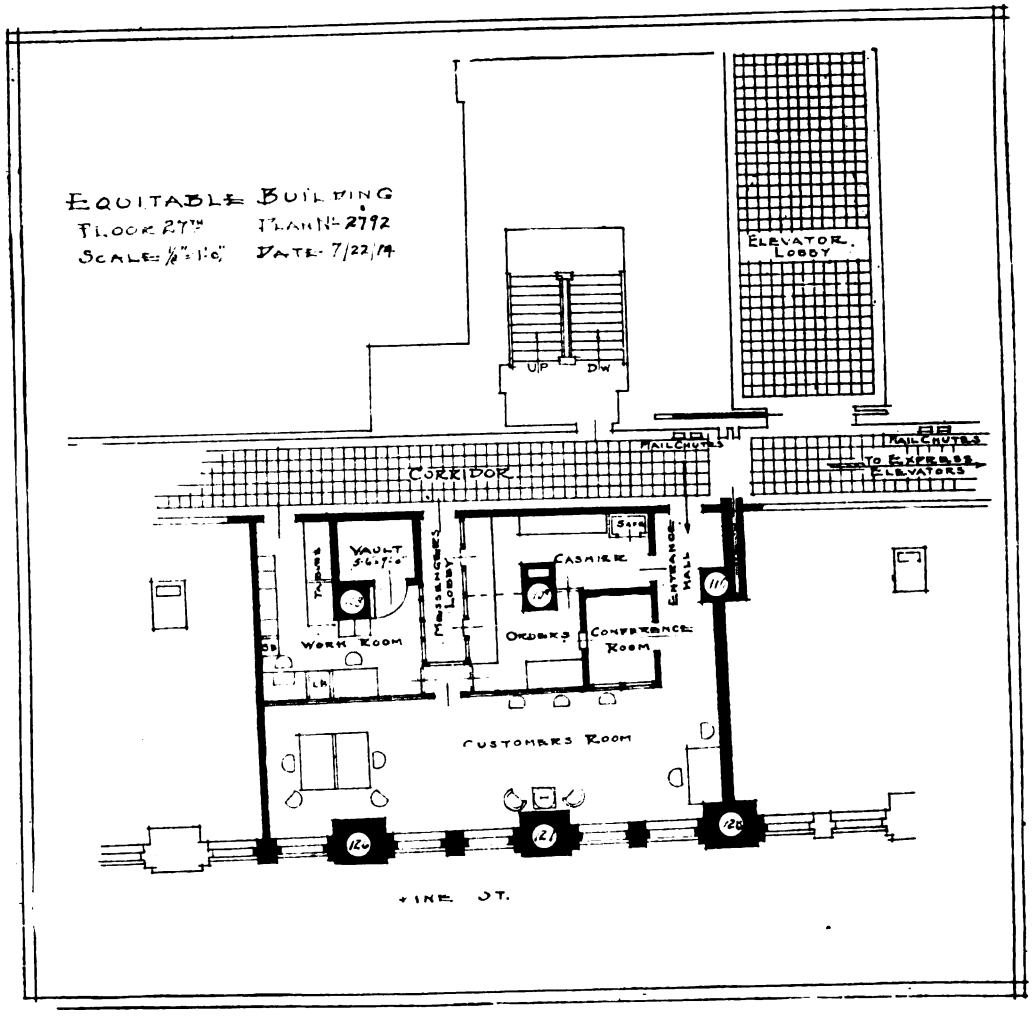
Three Exhibition Layouts of Lawyer's Offices: a—2 rooms and lobby, 428 square feet; b—3 rooms, lobby and library, 887 square feet; c—3 rooms, library, file room and lobby, 1368 square feet.



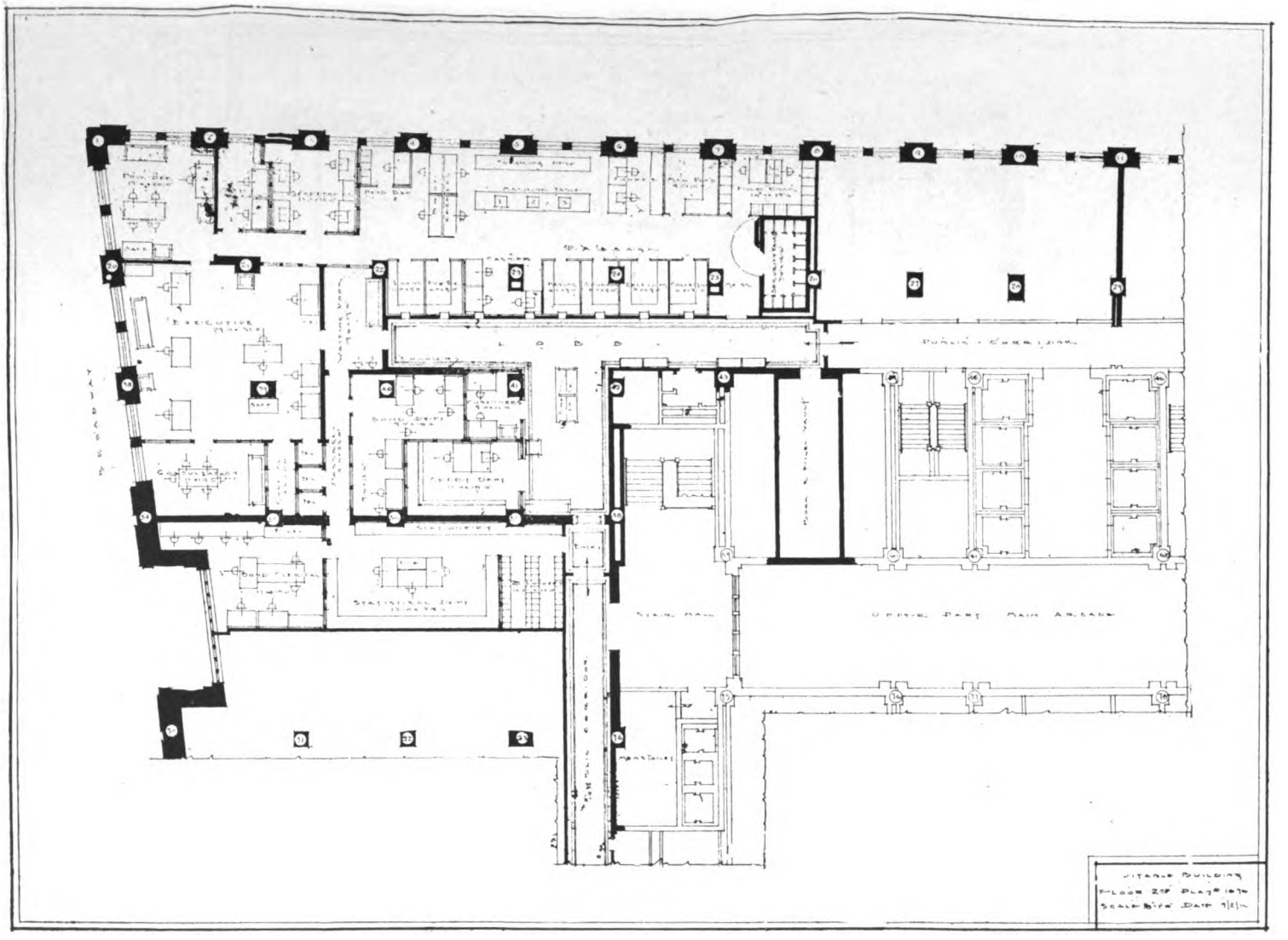
Layout for Executive and Selling Offices of Industrial Co. Area, 3567 square feet.



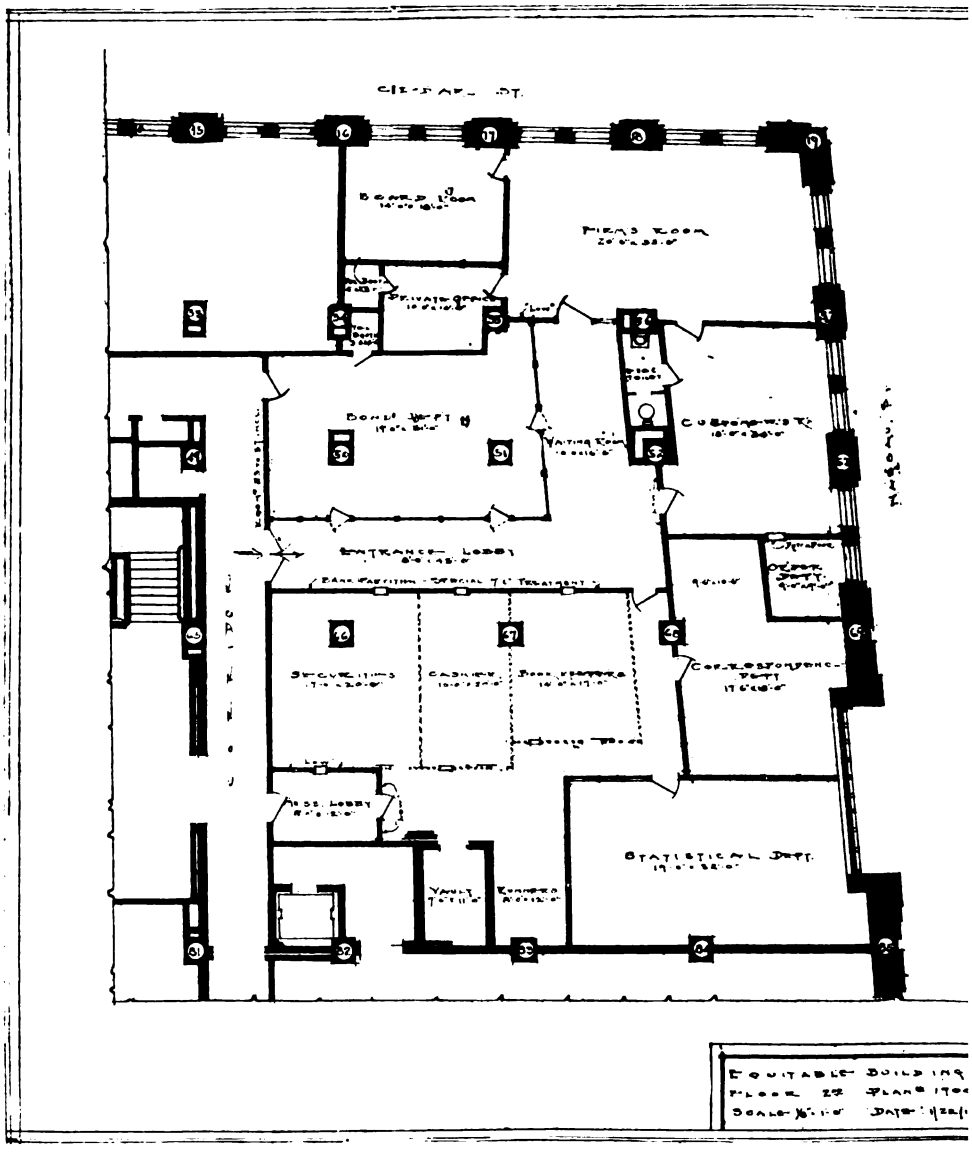
Layout for Large Broker's Office. Area, 4128 square feet.



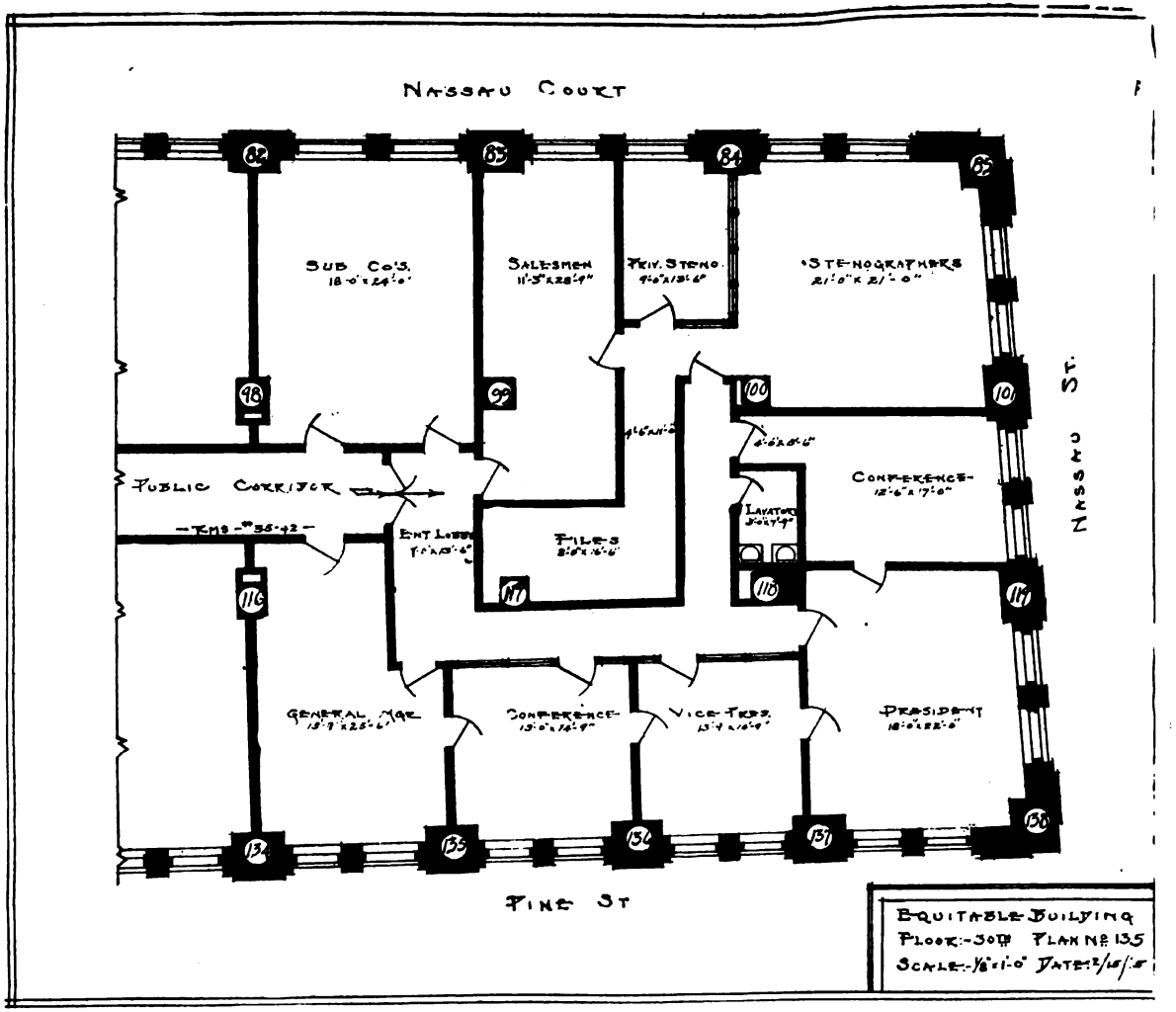
Small Broker's Office. Area, 1188 square feet.



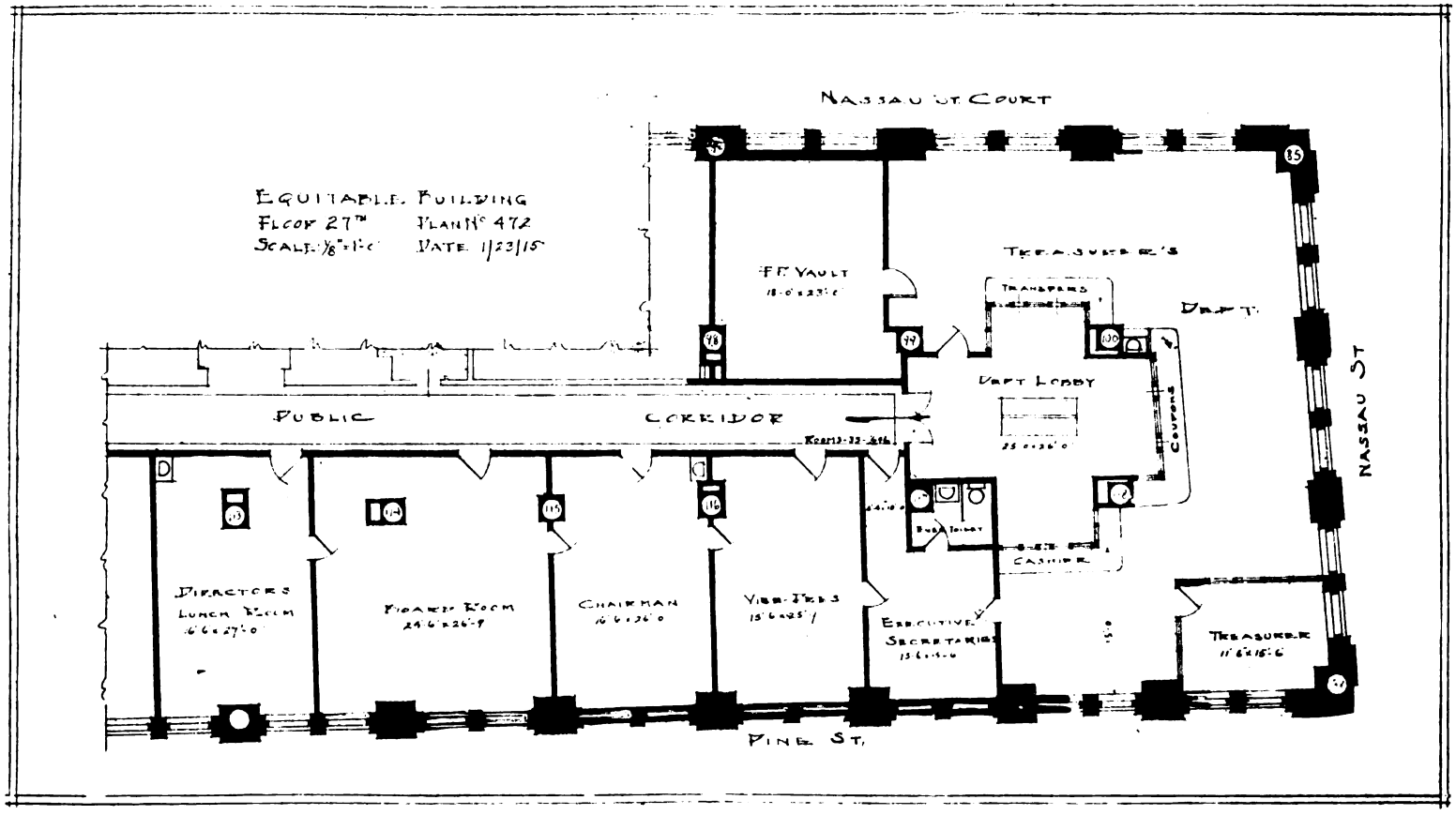
Layout for Large Private Banking Office. Area, 7560 square feet.



Showing Layout of Private Banking Office. Area, 5564 square feet.



Typical Layout for Sales Organization. Area, 3567 square feet.



Layout for Executive and Financial Offices of Railroad. Area, 5109 square feet.

The Problem of Security Solved

With fifteen thousand tenants to serve, the question of control of the doors becomes one of unusual importance, for there are not only the convenience and the protection of the tenants to be considered, but the movements of the small army of janitors and caretakers of various kinds, who must have ready and unimpeded access to the portions of the building to which their duties call them. All of this has been gained through the selection of the locks, the adoption of a flexible master key system.

The Corbin cylinder locks and the Corbin system of master keying, which has been approved by engineers and architects for some of the most involved and intricate problems of the kind, have been adopted here. Every tenant has a key which will unlock the corridor door to his own office and will fit no other, and also a key to the toilet room. These give him access to the parts of the building to which he should have entrance, and to no other. All the inner or communicating doors to each suite have thumb-pieces instead of keys, so that privacy can be secured in any room desired. The janitors on each floor have master keys which will admit them to any room on the floor, but will not fit the doors of any other floor, thus limiting the entrance to the rooms in which work is to be done. The janitor's master key can also be used to lock any toilet so that it cannot be used.

The same care in key selection is observed in the portions of the building devoted to the service. The wiremen, the electricians, and the plumbers' keys will admit them only to their own particular field or effort. The men who care for the telephone service have no access to the lighting circuits, and the plumbers' keys will not open doors to either the telephone wire shafts or the switchboard cabinets—a division of responsibility which is very necessary where the best service is required. The manager holds a grand master key which will fit any lock in the entire system, and gives his office control of all doors.

It is said that the Equitable Building will have the lowest fire rate of any structure of the kind in the country. The building has a steel frame and is composed of material which is not inflammable. Steel doors and window sash and steel interior finishing replace the wood of an ordinary structure. It has been recognized that fires may grow dangerous in fireproof structures because of the inflammable contents of the rooms, and fire cut-off doors have been provided for entrances to stairways and elevator enclosures, so that, if a fire should occur, it can be confined to the floor on which it started. These doors have been fitted with Corbin fire door locks, so made that when the steel door is closed, bolts are automatically thrown, fastening the door to the frame at six widely distributed points, very much as a safe door is bolted, so that no amount of heat could so warp the door that it would be open—a provision which meets with the approval of the fire underwriters. The same locks are to be used on the fireproof vaults on each floor.

Other problems beside those of security have had their solution in the choice of hardware. The heavy steel doors must be swung upon butts, which are strong and will not wear perceptibly, and hence, there have been selected solid cast bronze butts of ample size and strength, made and fitted to templates, so that they are interchangeable, and of a type suited for steel doors.

Quietness and freedom from draughts are assured by the use of Corbin door checks of the latest model, in connection with Corbin door stops, to hold the door open when desired. The transoms have solid bronze transom lifters, and the knobs and escutcheons are of a plain pattern with line borders, the knob bearing the letter "E" in relief. The order for finishing hardware is one of the largest ever placed for a single building, weighing over 200,000 pounds. Only a small portion of it required special treatment, and this was a factor of importance in supplying the goods, the most of which were ready for the building before they were needed.

American Real Estate Company

Conservative management and wise financing are shown in the figures of the Twenty-seventh Annual Statement of the American Real Estate Company as of the end of its fiscal year now published. An increase of only slightly over $30,000 in its bond obligations and over $850,000 in paid-up preferred and common stock adds a larger margin of security to the holder of its bond obligations. In view of depressed conditions in the real estate market, and in harmony with the company's well-known policy of conservative management, in the appraisal upon which the figures in the statement are based, it has taken up the values of its properties upon a basis which reduces the surplus about $500,000. The increase in new capital created during the year, however, leaves a margin of capital and surplus of over $3,500,000, or more than $300,000 greater than last year.

The Boiler Installation.

The boilers of the Equitable Building are of the Heine all steel high pressure water tube type, built by the Heine Safety Boiler Co., of St. Louis, Mo. Steam is furnished for the Corliss engines driving the dynamos, and also for heating, hot water and general service in the building. The boilers are installed 40 feet below the street level and arranged in a row on one side of the firing aisle. There are five boilers of 450 horsepower and two of 550 horsepower, aggregating 3,350 horsepower. Each boiler has two drums and the tubes are divided into two nests by baffles, so there are two long horizontal passes for the hot gases, as shown by the drawing of Fig. 1. A view of the boiler room itself is shown in Fig. 2.

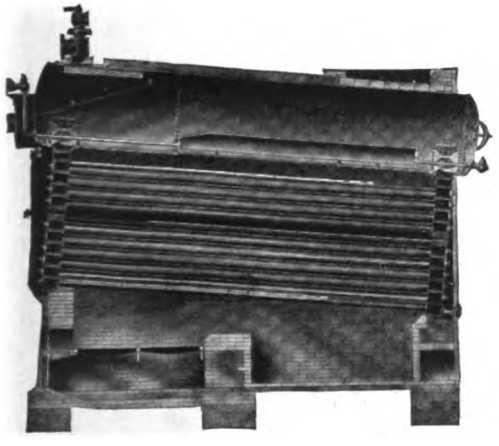


Fig. (1). Longitudinal Section of Heine Two Pass Boiler, Type Installed in Equitable Building.

In Fig. 1 the baffle tile placed on the bottom row of tubes and extending well behind the bridge wall forms the roof of a combustion chamber in which all volatile matter is completely burned, so that smokeless combustion is secured. The hot gases then turn up into the first nest of tubes and pass to the front, parallel to the tubes; the gases then turn into the second pass and flow to the rear, giving up the remainder of the heat before rising to the chimney. This design of boiler, with two long horizontal passes for the gases and the close spacing of the tubes, results in very high efficiency of heat absorption and low flue gas temperatures. The design is similar in many respects to that of the Heine boilers installed in the power house of the Grand Central Terminal, New York.

The boilers are fitted with permanent soot blowers, consisting of steam nozzles fitted into the hollow stay bolts of the water legs, front and rear. Powerful jets of steam are discharged amongst the tubes, setting up intense momentary draft and dislodging the soot and dust from the tubes and carrying it up the chimney. These boilers are also fitted with casings and doors, both front and rear, so that the possibility of air in leakage is reduced to the minimum, thus preventing waste of fuel, from this very common cause.

The rear casing doors and the steam manifold and crab of the soot blower may be seen in Fig. 3, a view of a boiler from the rear. This photograph also shows the construction of the water leg for the two drum boilers, also mud drum blow-off pipes and water leg blow-off connections.

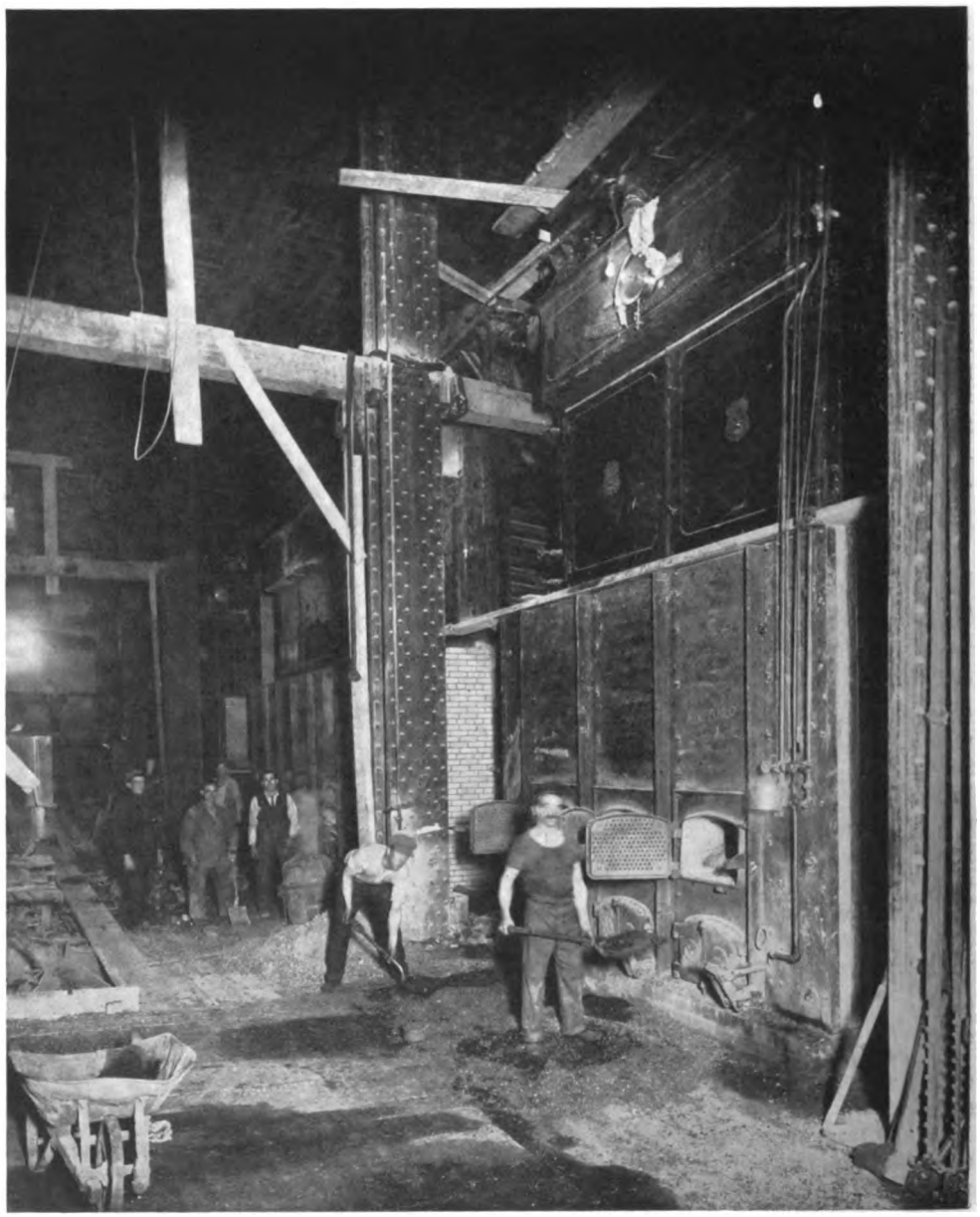


Fig. 2. Boiler Room of Equitable Building.

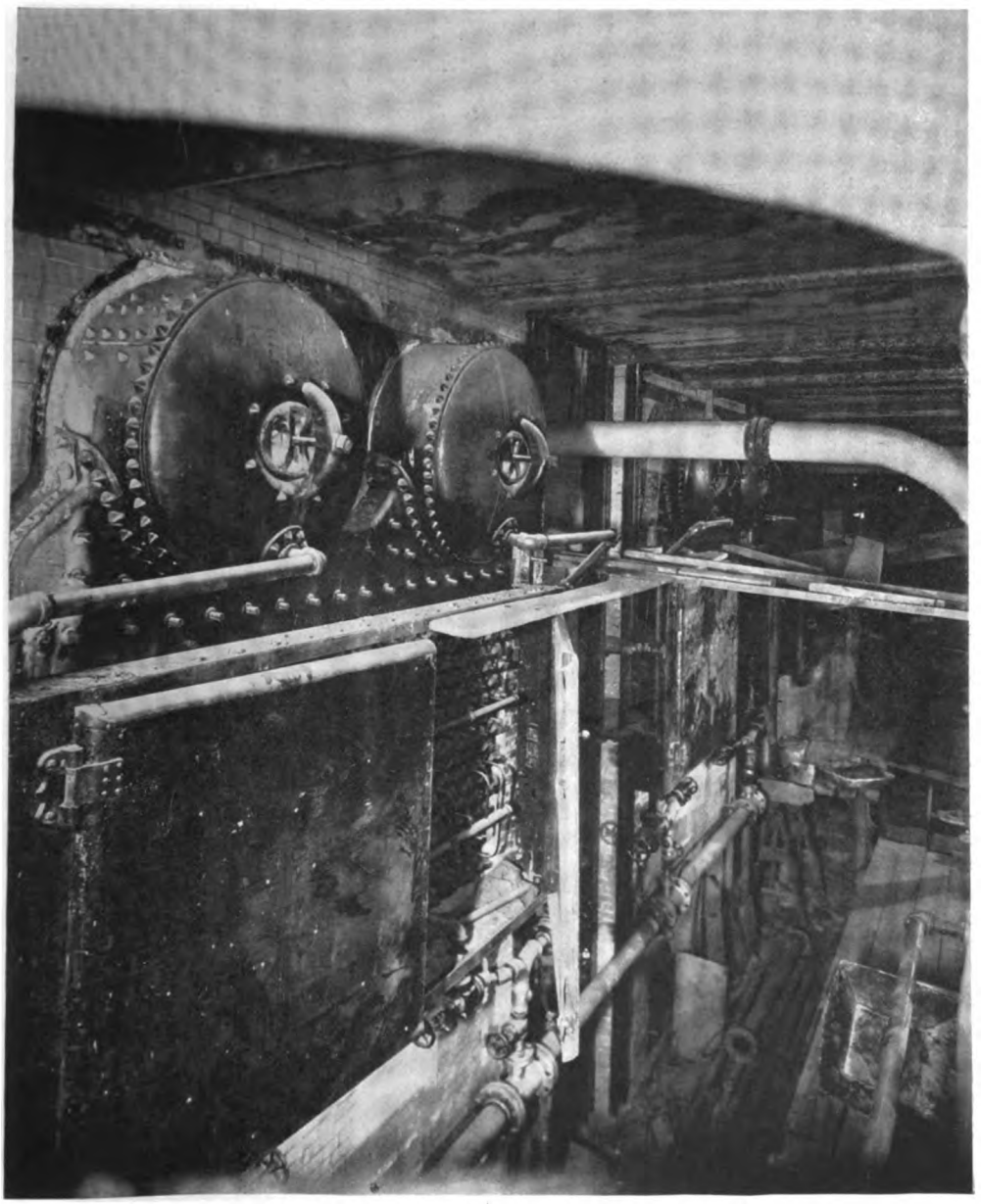


Fig. 3. Boilers from Rear, Showing Rear Casing and Doors and Soot Blower.

Work of the State Association

The New Tax Bill Discussed---Important Meeting in Syracuse

By M. Morgenthau, Jr.

President of the Real Estate Men's Association of the State of New York.

THE Real Estate Association of the State of New York has certainly had its hands full during the last few weeks. Anyone who has doubted the need for the existence of an organization of this kind must certainly have had his doubts removed if he has followed the splendid work which the association has been able to do in connection with certain legislation at Albany. The cordial way in which the leaders of the Legislature have met the association's representatives demonstrates that the real estate men rather than the Senators and Assemblymen have been at fault if there has been any disregard of the interests of the real estate owners and dealers.

Which reflection brings us to the matter which was brought to the attention of the Legislature by the association, to wit: the new tax bill. This bill was heralded as a reform measure —it was going to solve the tax problem of the State; it was going to relieve the real estate owners of inequalities and inequities; it was going to place the business of raising the revenue to run the State on an economically sound basis. Real estate men, tax experts—so-called—and others were called into conference, and this reform measure was evolved. But lo! when the measure was examined by our committee, it was found that the form was there, but the reform was conspicuous by its absence.

The association got busy. It notified the Governor of its findings and it requested a hearing. The Governor assured us that he approved of our recommendations, but said that he was not the law-making power of the State, that it was up to the Assembly and Senate, but that he was with us and would sign the bill if we secured the proper amendments.

The Executive Committee of the association thereupon held a meeting at Syracuse. Chairman Charles F. Warner, of the Committee on Taxation, reported that his committee found the bill objectionable as now drawn and felt that the adoption of such a bill under the guise of reform would close the possibility of securing a real reform measure for many years to come. He reported that such men as Attlebert Moot of Buffalo, Major H. J. Cookinham of Utica and Alfred E. Holcomb of New York City were unanimous in condemning the bill as drawn. The Executive Committee unanimously indorsed this position and DeLancy M. Ellis was summoned by telephone to the Albany end of the wire, and requested to appear at the Albany hearing and voice our sentiments. Through his efforts the matter was laid over and we were given a week to present our suggestions for amendments to the bill.

On Wednesday, February 17, I joined Mr. Ellis at Albany and together we interviewed the leaders of the Legislature and received most attentive consideration. Arrangements were made for submitting our views in the form of a brief, and Jesse W. Ehrich, one of the association's new members, an attorney of standing, and a real estate owner and dealer of many years' experience, was drafted into service to prepare this brief. Mr. Ehrich sacrificed his Sunday and Washington's Birthday holiday to serve the association. His brief went forward in time to reach the Legislature and will, no doubt, be effective.

Recommendations of Importance.

The recommendations contained in this brief will be of interest. Four

chief points were made. First, a provision must be made to assure with reasonable certainty that high-class men shall be appointed as Tax Commissioners. To secure this, it was suggested (a) that the terms of the Commissioners be increased to six years; (b) that the commission be made non-partisan; (c) that one Commissioner shall be a lawyer of ten years' standing and another a real estate man of equal experience; (d) that each Commissioner shall devote his entire time to the duties of his office and shall be removable by the Governor for cause; (e) that the salaries of the Commissioners shall be sufficiently large to induce the right sort of men to accept these positions.

Second—The provision for reassessment should be so arranged as to make it truly effective. (a) In order to secure this we suggested that the reassessment should be made by the Tax Commission through a board composed of three persons, one of whom shall be the chairman, to be selected by the commission itself and the other two should be selected by the commission from six names submitted by the Board of Supervisors of the county where the reassessment is to be made. (b) It was submitted that the law as drawn does not cover reassessment in New York City. Changes were suggested to make it so applicable. (c) We asked that it be provided that any taxpayer in the county might apply for a reassessment which would be made if, on investigation, the commission finds that the assessments are not in substantial compliance with the law. (d) We suggested that in order to prevent any delay in the collection of taxes on account of reassessment a provision for adjusting such reassessment on the tax rolls of the following year be made.

Third—We called attention to the omission of a provision for equalization of assessments between the five counties constituting the City of New York and suggested a remedy by giving the Borough President whose district is coterminous with the county the authority to appeal to the commission on behalf of his county.

Fourth—We made a number of miscellaneous to bring this law into compliance with the accepted standards of the best legislation of this kind in other States, and suggested further that, on the one hand, the commission be given full authority without restriction to run this department, and, on the other hand, be limited to some extent as to the salaries and disbursements of its staff through the annual appropriation bill.

The Syracuse Meeting.

You might think from this account that all the energies of the association have been devoted to this matter of taxation. If so, you do not know how the work has grown in the four months since the new Executive Committee and I took hold. Syracuse has been mentioned as the favorite city for the February Executive Committee meeting. S. T. Betts, who with Secretary Reed cradled the association ten years ago in this town—which one was the father and which one was the nurse is soon to be disclosed in a history of the association now in preparation—welcomed the committee as only Betts can. An invitation arrived from ex-President Betts for luncheon at the City Club, and this was followed by a sightseeing expedition, and the day ended up with a banquet at which over two hundred real estate men from some twenty-five surrounding cities and towns gathered.

The Executive Committee finally adopted the association's Code of Ethics after months of labor on the part of the committee composed of James Frank, L. D. Woodworth and I. H. Lehman. The code is printed in full on another page, and the Executive Committee wishes it to be known that this code will be changed and amended from time to time. The committee will be glad to receive suggestions with reference to this from the members.

Affiliation was thoroughly gone over and the constitutional amendments which have since been approved by the members were carefully considered. Tentative applications from a half dozen organizations in various parts of

the State were received and referred to a committee appointed by the president. It was the sense of the committee that affiliation should be encouraged as much as possible, but that a minimum fee of $25 should be charged so as to make possible a really valuable service. It was suggested that where the major portion of the members of the association are already members of the State association the minimum fee should prevail. Of course, affiliation does not convey any membership privileges. It merely entitles the affiliated organizations to receive information regarding matters affecting them throughout the State, to the service of our Albany counsel in matters affecting legislation, and to the co-operation of the association wherever such co-operation is deemed advisable by our Executive Committee. Thus, the Real Estate Board of Brokers of Brooklyn have asked us to help in securing a modification of the tenement house laws so as to permit of the erection of three-family houses. The West Side Taxpayers' Association of New York have asked our co-operation to prevent the establishment of a new city market department.

A Taxpayers' Bureau.

I brought up a matter which is fraught with tremendous possibilities. I reported that several of the large property owners of New York City had suggested the establishment of a bureau at Albany to look after the interests of the taxpayers throughout the State. The idea is to place a first-class business man, preferably one with real estate experience, in charge of this bureau, and to raise sufficient money to enable this man to do effective work. The taxpayers have learned at last that it is very much more expensive to attempt to change laws after they are passed than to keep them from ever seeing daylight. Much beneficial legislation, which the enlightened taxpayers will approve in principle, is put through hastily and in such form as to be of tremendous harm to the property owners. Thus there are provisions of the labor law, the tenement house law, the fire prevention statutes, which, while perfectly correct in principle, are working needless hardships. These men who have suggested the establishment of this bureau have backed up their suggestion by offering to contribute their full share.

The Executive Committee fully approved of this suggestion and recommended that the president take this matter up without delay and start a campaign to raise the necessary money. It has been estimated that not less than $25,000 will be required to properly establish this work. As there is absolutely no state-wide organization looking out for the interests of those who pay the bills, there certainly should be no difficulty in raising this fund within a fortnight.

Work of the Last Month.

An account of the doings of the association during the last month would not be complete without mention of the association's Brooklyn dinner and smoker on the eve of Lincoln's birthday. Comptroller Prendergast of the City of New York, a Brooklyn man, was the guest of honor. He was in fine form, and although he said that Gladstone was the only man who has been able to make the subject of finance entrancing he held his audience spellbound for over an hour while he recited intimate facts in connection with the city's financial structure. He then asked for questions, and he got them. For another half-hour he was kept busy answering this man and that, until he was compelled to call a halt and ask for an adjournment, which was readily granted on condition that he would surely keep the appointment. There followed a brief discussion of the three-family house problem by Mr. Audley Clarke, and a motion was unanimously carried that this subject be taken up by the Executive Committee of the association. The matter of the regulation of brokerage, which was down on the program for discussion, was adjourned until the next smoker. This it is proposed to hold in Manhattan on or about March 18.

The next meeting of the Executive

Committee will be held in Rochester on March 13. The Executive Committee will be the guests of the Rochester Real Estate Association at their annual banquet, which will be held that night. L. D. Woolworth, our energetic first vice-president, is president of this Rochester local board, and will act as toastmaster at the dinner.

Code of Ethics, Real Estate Association of the State of New York:

The golden rule is our standard of conduct for owner, dealer and broker.

1. In every case there shall be honesty and fair dealing; also a regard for the obligations to both buyer and seller, and for associated broker.

2. There shall be no misrepresentation of facts in any dealings affecting realty.

3. Standard rates of commission will be demanded by agents and brokers able to furnish the expert service which they promise.

4. Agents shall not accept secret rebates on repairs or supplies for property in their charge.

5. Expert advice should only be given by one who is qualified and who has made careful personal inspection of the premises.

6. Property shall not be offered for sale, lease or mortgage without the knowledge and consent of the owner, which should be expressed in writing.

7. Sole agency listings are essential to best service by brokers and agents. Listings at fictitious prices should be declined.

8. Only one sign on a property is for the best interest of community, owner and broker.

9. Funds received in a fiduciary capacity, such as rents and insurance premiums, should be kept in separate bank account, protected from business hazards.

10. Disputes should be settled by arbitration and conciliation, in preference to litigation.

These standards apply to all members and to their employees.